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INFANTRY JOURNAL

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Intensive Training of the Infantry Soldier, the Infantry Noncommissioned Officer, the Infantry Squad

By Major Elvid Hunt, General Staff, U. S. A.

I. Application of the "Scientific Management" of the Industries to the Process of Soldier Development and Training

THE application of the science of "Scientific Management" to the manufacturing industries has produced remarkable results. The records of the work of efficiency engineers in installing "Scientific Management" in various industrial plants are very interesting. The charts of their time studies, motion studies, and various investigations and tests have located and corrected even in plants considered highly efficient such primary industrial faults as:

Duplication of effort.
Misdirection of energy.
Waste of time.
Imperfect cooperation.
Misassignment of individuals to tasks, etc., etc.

Can the industry of developing and graduating trained soldiers into the Reserve apply any of the principles of the "Scientific Management" of the manufacturing industries?

"Scientific Management," feeling its way in the military establishment, would demand almost at once, just as it does in industry, that the product be *standardized*. And there is the chief matter of interest:

Define a standard soldier.

What is his endurance? What must he know?

What must he be able to do? What tests must he stand?

The rapid development of modern warfare as exemplified at present in Europe indicates clearly that the standard soldier of this year may not meet the requirements of next year's warfare. In other words, the soldier standard may change as rapidly in our modern times as do the models of the automobile world.

Nevertheless, there must always be a well-defined standard.

Under a system of short enlistment, intensive training, and the building of a large reserve, there must especially be a standard.

The standard must be fixed in the minds of all who instruct and direct.

Increments of untrained or partially trained officers must early be familiarized with the standard.

Conforming to War Department

Regulations and Orders and to observe high standards attained in many organizations, and exemplified in many developed and trained soldiers of superior class, the following is a suggested reasonably high class standardization of the infantry soldier to meet the requirements of the present year. It is a working standard, and includes only essentials in which it is desired to test and measure the military efficiency of the individual soldier. Since it is a suggested standard and individually interpretative of regulations, it is elastic and should be improved whenever possible.

It does not include many things which the soldier learns in the routine of his service.

It keeps in mind the development of the highest field fighting efficiency in the individual, and the proportionate use of disciplinary close order work makes to that end.

The method of close order training hereinafter described, obtains very high results with the expenditure of a minimum of time, and completely develops the disciplinary and morale building value of such drills.

The requirements of the standard group themselves as follows: (1) standard of training; (2) standard of physique; (3) standard of morale. The standards of physique and morale are gradually attained during the progress of instruction and training.

II. Suggested Standard U. S. Infantry Soldier (1916)

A. Suggested Standard of Training

The individual soldier to be required to qualify according to a high standard of efficiency in the following:

1. Manipulation of the pack.
2. Nomenclature, care, and use of the rifle.
3. Gallery practice.
4. Outdoor range practice.
5. Manual of arms, etc.
6. Drill.
7. Interior guard duty.
8. Bayonet exercise and combat.
9. Hygiene and first aid.
10. Signalling.
11. Marching.
12. Elements of field service.

The special requirements for qualification in the above to be as follows:

I. Manipulation of the Pack.

1. Nomenclature of the pack.
2. Make the pack.
3. Sling and unsling the pack.
4. Prepare the pack for inspection.

II. Nomenclature, Care, and Use of the Rifle.

1. Name and indicate thirty principal parts of the rifle.
2. What is meant by the "caliber" of the rifle?
3. What effect on the bullet has the spiral rifling in the bore?
4. Remove the bolt and the firing pin and reassemble.
5. Demonstrate the proper method of cleaning the rifle.
6. Describe the proper method of keeping the rifle in good condition during field service.
7. Five sight-setting tests for elevation and windage.
8. Explain the different sights and describe their use.
9. Adjust the sling and take the proper firing positions standing, sitting, kneeling and prone.
10. Five tests for elevation and windage to bring placed shots to the bull's-eye on the 500-yard target.

11. Five loading tests for facility in loading with dummy ammunition.

12. Two ten-shot rapid fire tests without ammunition for deliberation of aim and timing of shots.

13. Tripod aiming test for small triangle.

14. Test of knowledge of trigger squeeze and breath control when firing.

III. Gallery Practice.

1. Qualification score required by firing regulations in each of the firing positions.

IV. Outdoor Range Practice.

1. Qualification marksman's score required by firing regulations.

V. Manual of Arms, Etc.

1. Manual of arms by the numbers with required accuracy and precision.

2. Manual of arms without the numbers.

3. Parade rest, trail arms, fix and unfix bayonet.

4. Rifle salute, explain uses.

5. Inspection arms. Practice inspection.

6. Stack arms. Take arms.

7. Forward march. Halt.

VI. Drill.

1. Assume proper position of attention.

2. Facings.

3. Proper carriage of body and piece in marching.

4. Mark time. Side step. Backward march.

5. By the flanks. To the rear.

6. Eyes right. Right dress.

7. Hand salute. Explain uses.

8. Action as pivot and as various numbers in squad right and in squad right about.

9. Obliques. Turns.

10. Action as various numbers in "As skirmishers."

11. Proper execution of load, aim and fire.

12. Proper action in volley fire, fire at will, clip fire, suspend firing, cease firing, unload.

VII. Interior Guard Duty.

1. General orders.

2. Orders for Post No. 1.

3. Halts and advances.

4. Calls (corporal, the guard, fire, relief).

5. Salutes.

6. Duties of No. 1 of the guard.

VIII. Bayonet Exercise and Combat.

1. Proper execution of guard, foot movements, parries, cuts, butt, strike, lunge and thrust.

2. High efficiency in bayonet fencing and combat.

IX. Hygiene and First Aid.

1. Describe the make and fit of the proper marching shoe and of the proper marching sock.

2. Describe the proper care of the feet from day to day on extended marches.

3. Describe the proper treatment of blisters on the feet.

4. How are malaria and typhoid prevented in the Regular Service?

5. Demonstrate the application of the First Aid Packet.

6. Demonstrate resuscitation from drowning.

7. Demonstrate stoppage of bleeding.

8. Demonstrate bandaging, care of fracture, slings.

9. Demonstrate carrying patient.

10. Demonstrate placing of patient on litter.

X. Signalling.

1. Proper interpretation with speed of drill and firing signals.

2. For musicians, noncommissioned officers and selected privates; flag signalling.

XI. Marching.

1. Tested and rated marching with and without pack over measured courses.

XII. Elements of Field Service.

1. Tests of individuals for correct action in probable situation in which individual would be required to act in various forms of field service. (Details on pages 94 to 98.) Forms of field service ordinarily met are:

(*a*) The advance guard.
  (1) Patrolling from the advance party.
(*b*) The rear guard.
(*c*) The outpost.
  (1) Camp sanitation. (Study of the "Main Body.")
  (2) Pyramidal and wall tent pitching. (Main body.)
  (3) Shelter tent pitching.
  (4) Individual cooking.
  (5) Patrolling from the reserve and from the outguards.
(*d*) The march outpost.
(*e*) The position in readiness.
(*f*) The company in defense.
  (1) Intrenching, practical and theoretical.
  (2) Construction of obstacles.
  (3) Estimation of distance.
  (4) Range finding.
(*g*) The company in attack.
  (1) The use of cover.
(*h*) Night maneuvers.
(*i*) Exercises involving cavalry and artillery.

B. Suggested Standard of Physique

If the physical field efficiency and fighting ability of troops is to be brought up to its maximum, considerable attention must be given to its development. Under the present system of enlistment, the following should improve the physical standard:

1. *Physical-athletic study of individuals by experts in physical training, assisted by medical officers, with:*

(*a*) Tabulation of results on individual physical-athletic record card.

(*b*) Classification of individuals according to fitness into classes "A," "B," "C," etc.

(*c*) Recommendation of special exercises, gymnastics, and athletic sports for individuals and for classes of individuals.

2. Supervision and direction of physical instruction and general athletics by selected officers.

3. Use of competitive athletics as an auxiliary to general athletics.

4. General use of outdoor gymnastics.

5. General instruction in all forms of aggressive combat.

(*a*) Bayonet combat.
(*b*) Boxing.
(*c*) Wrestling.

6. Tested efficiency over measured 1 and 2 mile courses in rated *route marches.*

Under a short enlistment and a reserve system, the problem has some peculiar features. The Army then performs its maximum service in the matter of physical training if it sends the reservist back into civil life in a physically fit condition and with certain tendencies and a knowledge and sense of responsibility which will keep him in such condition. The very great responsibility then rests, if the nation is to pre-

serve its maximum power of resistance, upon civilian communities and groups to:

1. Systematically develop soundness and physical efficiency in all growing boys and youths.

2. Bring about the general and habitual participation in outdoor life, sports and athletics among men of military service age.

The physical standard desirable in the graduated reservist may reasonably be stated as follows:

1. Sound organs of the senses, with an ingrained tendency toward preserving such condition until past military service age.

2. Sound vital organs.

3. Efficient muscular development, with strong ingrained tendency toward preserving such condition until past age of military service.

4. Reasonable proficiency in varied outdoor sports and athletic games in order to create tendency toward participation in outdoor sports until past age of military service.

5. Reasonable proficiency in simple gymnastics.

6. Reasonable proficiency in the following forms of aggressive combat:

(*a*) Bayonet combat.

(*b*) Boxing.

(*c*) Wrestling.

7. Maximum efficiency in rated route marching over measured courses.

C. Suggested Standard of Morale

1. Character given a strong tendency toward alertness, self-respect, assurance, fearlessness, and just aggressiveness by military drills and exercises and by development of individual efficiency in combat.

2. A high standard in personal military appearance and neatness.

3. Development of patriotism and appreciation of United States citizenship.

4. Development of strong tendency toward abstinence from forms of dissipation which may lessen military efficiency during the period for which liable to service.

5. Improvement in general education as an aid to self-respect.

III. The Noncommissioned Officer (Suggested Standard of Training)

In addition to the requirements of qualification according to the standard outlined for privates of infantry, noncommissioned officers must have special knowledge and requirements in which they should have thorough qualification tests before being declared fit for field service. Additional requirements are outlined as follows:

1. Proficiency as guides in close order and particularly as column leaders in route marching.

2. Qualification as aggressive leaders and drillmasters.

3. Qualification as squad instructors in all branches of the standard of training as outlined on preceding pages.

4. Thorough knowledge of the elements of field service as they pertain to the duties of privates and noncommissioned officers (outlined on pages 94 to 98).

5. Thorough knowledge of interior guard duty, particularly the duties of noncommissioned officers.

6. Especial skill in range finding and in distance estimation.

Proficiency in the following:

7. Patrol leading.

8. Elementary military map-making.

9. Rapid rough map-sketch making.

10. Rapid preparation of written messages.

11. Practical map-reading.

It is especially important in the United States service that as many qualified noncommissioned officers as possible be developed in a company. A maximum of service to the United States will be rendered if every man of sufficient education and leadership ability in the company is developed and qualified as a possible noncommissioned officer and his efficiency recorded. In time of war the demand for noncommissioned officer military instructors and leaders will be very great. eLadership ability and aggressiveness will develop very rapidly under direction and if frequent opportunity is given to exercise command and impart instruction.

IV. The Squad

The squad is an extremely important unit in the company, and the combat efficiency of the company depends very much upon the efficiency of the squad. To develop it to its maximum requires much attention. The strength of the squad is very much the strength of the leader, and the supervised method of group instruction of individuals outlined on page 91 will rapidly develop aggressive leadership in squad leaders and cause the squad unification and training to progress more rapidly. There should be prescribed definite requirements for the trained squad, and it should be required to undergo thorough qualification tests in these requirements. The trained squad should come up to the following standard:

1. Qualification in close-order drill, school of the squad.

2. Qualification in extended-order drill, school of the squad and deployment in any direction with maximum speed.

3. Maneuvering as a patrol with maximum efficiency of protection, observation, communication, etc.

4. Delivering bayonet charge with maximum squad force and squad cohesion.

5. Finding and covering an indicated target with maximum efficiency.

6. Distribution of fire over target and shifting of fire with maximum efficiency.

7. Ready response to fire control.

8. Execution of squad rushes with maximum speed and with minimum exposure of body at the beginning and at the end of the rushes.

V. Management of Instruction

The application of "scientific management" to the attainment of the individual standard of training will require a system which practically eliminates the following faults:

1. Time waste.
2. Duplication of effort.
3. Misdirection of energy.
4. Imperfect cooperation.
5. Misassignment of individuals to tasks.

The company commander can without difficulty apply the principles of "scientific management" to the training of his company and by means of "time studies" and "motion studies" will be able to locate and measure defects.

Considering only that portion of company training which has to do with instruction of the individual, a system of instruction fulfilling the above requirements will have the following features:

1. *Simultaneous instruction of two or three or more groups in different subjects of training, individuals being assigned to groups receiving instruction*

in which such individuals have not qualified.

2. Instructors and assistant instructors selected and assigned to groups according to skill and fitness in instructing in special subjects.

3. Captain acting as director of the instruction, with special attention to securing maximum efficiency and cooperation in the work.

4. Avoidance of unnecessarily requiring individuals to undergo long periods of instruction in subjects in which they have already qualified.

5. *Special attention to the development of qualified men who have leadership ability into efficient instructors and possible noncommissioned officers.*

6. Constant opportunity for noncommissioned officers to instruct and command, with view of developing in them a high order of aggressive leadership.

7. *Subject instruction carried on by the method of supervised and directed small group instruction.*

8. Concentration upon defects.

9. Exemplification of standards.

10. *Qualification tests of individuals.*

11. *Graphic recording and measuring of progress.* (See page 98.)

12. Separate instruction for defectives. (See page 99.)

SUPERVISED AND DIRECTED SMALL GROUP INSTRUCTION

The method designated as "supervised and directed small group instruction" is a most important feature of the system because:

1. It develops with surprising rapidity aggressive leadership and ability to instruct in noncommissioned officers.

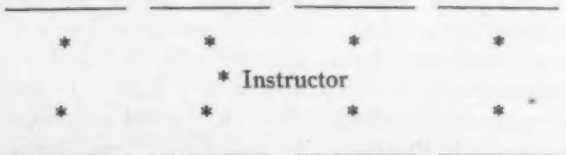
2. It permits absolute control and direction of the progress of instruction by the instructor.

3. It facilitates stimulation and discipline of noncommissioned officers and men by the instructor.

4. It affords excellent opportunity for trying out and developing new noncommissioned officers and selected privates as instructors and leaders.

Describing the method in detail, consider, for example, a subject group receiving instruction in the manual of arms under a specially selected assistant instructor.

The subject group is formed into two lines of small groups facing the instructor; groups in single rank, noncommissioned officers commanding small groups, instructor between the lines as in the diagram.



The development of unit (squad, platoon and company) cohesion should, of course, proceed during this period of preliminary instruction, but individual instruction should be according to the supervised group method.

The instructor commands, for example, as follows:

Instruction in execution of "Right Shoulder Arms" and "Order Arms" by the numbers. Execute in this manner (exemplifies), being especially careful to ————, etc. Continue the instruction

until I command "Rest," at which command immediately bring your squad to the position of rest at the order and face me for further instructions. Take up the drill.

(The instructor stops the drill by means of the command "Rest" for any general instructions or admonitions.)

Or, consider, for example, instruction in marching and halting. The instructor commands:

Instruction in the execution of "Forward, March" and "Halt." Commands are Forward - March — Squad Halt. March your squads back and forth from the position they now occupy to a line 50 yards in rear of you. Halt your squads every few steps. Execute the movement in this manner. (Exemplifies with three or four selected noncommissioned officers.) Pay special attention to ————, etc. At the command "Rest," immediately bring your squad to the position it now occupies and bring it to rest. Take up the drill.

Or, consider, for example, instruction in sight setting. The instructor commands:

Instruction in sight setting. Set sights at 850 yards elevation, 2 points right windage. Open sight. Squad leaders verify and, when squad is correct, leaders assume attention, facing to the front. Take up the drill.

In order to secure high efficiency in the above form of instruction, observe the following with care:

1. Require exact obedience from noncommissioned officers.

2. Require noncommissioned officer instructors to obey instantly the commands "Take up the drill" and "Rest."

3. Confine marching practice to a strip extending about 50 yards back of the rest line.

4. Require groups to quickly return to exact first positions at instructor's command "Rest."

5. Halt the drill frequently and exemplify, make general corrections, stimulate, etc.

6. Place new leaders and acting noncommissioned officers between skilled instructor noncommissioned officers.

7. Pay especial attention to the instruction methods of noncommissioned officers.

8. Occasionally require a group of noncommissioned officers or qualified men to exemplify the standard.

As the men approach standard perfection they are placed in successive small groups under the instruction of the noncommissioned officer best qualified to put the finishing touches upon the instruction in that particular subject. *They are then subjected to the qualification test by the senior instructor or by the company commander.* If the tests interfere with the progress of instruction, they should take place after the drill.

When individuals qualify, their qualification is recorded and they are sent to a group receiving instruction in a different subject.

The stimulus of pride in the attainment of definite standard of skill will cause most of the men to quickly qualify in that standard. The other men can readily be qualified after special instruction under selected drill masters, with the added possibility of a few extra drills. Probably two or three men cannot with reasonable effort be qualified. Their deficiency should be recorded for later comparison with deficiencies along other lines and possible action by a board of officers. The handling of defectives will be separately considered later. (Page 99.)

The above outlines the method of supervised group instruction with the

aim of qualifying individuals. The method readily lends itself to instruction in all the branches of training outlined in the individual standard of training. (Page 86.) Development of the individual will proceed most rapidly and qualification to standard be most readily attained by this method, while the development of the noncommissioned officers as aggressive leaders will be very marked. The developing of a large number of trained noncommissioned instructors is extremely important in the United States, because their services will be so greatly needed in case of war. With a complete company complement of qualified and skilled noncommissioned officers the standardization of the individual training of a company will be attained in a very satisfactory manner.

VI. Instruction in the Elements of Field Service

The imparting of a thorough working knowledge of the elements of field service to the individual soldier is a matter of considerable difficulty. Blackboard talks and simple map maneuvers are of considerable assistance, but do not seem to be sufficiently vivid to assure that the individual understands and will conduct himself in the manner desired when in the field. The best method of instruction seems to be by means of vivid field demonstration and by repeatedly requiring the individuals to act correctly in the ordinary field service situations in which warfare might place them, until such correct action becomes to a certain extent a matter of habit.

The instruction of the individual in field service should proceed simultaneously with the thorough instruction of the company in the details of all forms of field work. The development of the individual is secured by intensive study and practice of the details and elements of the company field exercises involved.

The following outlines a method which has been used with excellent results.

Consider, for example, instruction in advance guard duty.

State to the entire company such a problem as will justify the use of the particular advance guard formation desired for the particular instruction in mind. Taking up, for example, the work of the *patrols of the advanced party*. Close up the company and command "At Ease." Demonstrate the proper way for the corporal to transmit orders and preliminary instruction to his patrol. (Squad leaders should maintain within their squads organized and instructed patrols so that patrols may move out with promptness.) Require several patrol leaders in the company to repeat the demonstration until sure that the instruction is grounded in all.

Demonstrate the correct formation of the patrol for moving out under the terrain conditions at hand. Require patrols to repeat the demonstration until sure that the instruction is grounded in all.

Demonstrate manner in which patrols should move out under the situation. Require patrols to repeat the demonstration.

Conduct the company to varied terrain and demonstrate the conduct of the patrol under varying situations and require patrols to repeat.

In the above manner continue the study and practice of advance guard duty, separating the salution of the entire problem into its minute details and

parts or fragments and studying the parts intensively.

Continue the instruction from day to day, *resuming the problem at the point where it was dropped the day preceding.* Thus several days may be spent in the study of advance party patrolling, several more on conduct of the advance party under varying conditions of surprise fire, etc., all under the general and special situations described in the statement of the original advance guard problem.

The actual warfare procedure of the problems should be simulated as exactly as the imagination permits. The procedure of the problem should not be hastened unless necessary, and then verbal explanation should be made of the proper wartime procedure covering the period of time omitted.

When the intensive study of the details of an advance guard problem is completed, conduct the problem as a whole in order to test the application of the detailed instruction. Conduct the solution of several advance guard problems under varying conditions, preferably with enemy outlined, using flags to represent firing, strength of enemy, volume of fire, etc. Permit the solution of problems to proceed without interference. Upon completion of each exercise or problem hold a company conference, obtaining criticisms and suggestions from officers and noncommissioned officers, the company commander summing up and stating approved solution of the problem.

If several errors have been made it is probable that the erroneous methods have to a certain extent become part of the thought and action habits of the individuals of the company and will probably be repeated under a similar situation. It is therefore of the greatest importance that the entire field exercise be repeated until solved correctly and in the most efficient manner of which the company is capable.

When it is evident that the noncommissioned officers and the privates of the company understand and are able to apply the principles of advance guard duty, the next form of field work on the general program of the company should be taken up and carried to a similar completion.

Problems in field work should frequently consider the company acting as a unit in a very large force. Especially in combat it is advantageous to study the action of the company as part of the support or reserve or as part of an extended firing line.

Individuals should not be marked "Qualified" in the "Elements of Field Service" until their proficiency has been carefully observed and tested.

The following is a suggested working outline of instruction requirements for a thorough knowledge of field service. The numbered details should be correctly demonstrated and practiced under varied conditions as elements of a stated field problem or exercise:

ADVANCE GUARD DUTY

1. *The Point.*

a. Orders to. Manner of moving out.

b. Conduct at variations in road terrain.

c. Conduct on observing enemy.

d. Conduct under surprise fire of varied strength from front and flanks.

e. Conduct in falling back.

2. *The Advance Party*

a. Formation on varied terrain and under varied situations.

b. Manner of sending out patrols. Giving orders to patrols.

c. Method of communication with support and with patrols.

d. Action under surprise fire of varied strength from front and from flanks.

e. Action in vigorous frontal attack to seize important point.

f. Action on meeting superior force. Action in retiring upon the support.

3. *Patrols from the Advance Party*

a. Transmission of orders and giving of directions by leader.

b. Formation and manner of moving out.

c. Manner of procedure on varied terrain. (Woods, defiles, inclosures, etc.)

d. Communication and control within the patrol.

e. Communication with the advance party.

f. Conduct upon observing the enemy.

g. Conduct in combating enemy's patrols in the renconter.

h. Conduct in gaining information of the enemy's position, strength, etc., when the advance guard encounters an enemy in position. Transmission of such information.

i. Conduct of patrol in combat firing.

j. Conduct of patrol when advance party is forced to retire.

k. Conduct of patrol in gaining observation positions to front and flanks.

4. *Connecting Files*

a. Manner of marching. Action at road variations.

b. Methods of communication.

5. *The Support*

a. Formation under varied situations.

b. Communication with advance party and with reserve.

c. Action under surprise fire of varied strength from front and flanks.

d. Action under surprise artillery fire.

e. Action in support of advance party by rendering flank patrol assistance.

f. Action in reinforcing the advance party under varied conditions.

g. Action in covering the retirement of the advance party.

h. Action in retiring upon the reserve.

6. *The Reserve*

a. Practically the same problems as the above (support), relative, of course, to the support and to the main body.

b. Method of advance at rapid rate of march for reinforcing support and formation of advance to avoid heavy losses.

c. Action in making flank attack upon enemy held in defensive position by fire of advance party and support.

THE FLANK GUARD

THE CONVOY

a. Flank guard and the convoy offer variations in advance guard formation studies.

ROUTE MARCHING

a. Methods and rating of marching over measured courses. (Special attention to individuals. Classify individuals if necessary and practice in classified sections.) Acceleration of speed.

b. Practice over short courses in keeping closed up and in position and in preventing straggling. Changing rate of marching.

c. Clearing road at rests. Side of the road and concealment from aeroplane reconnaissance marching. Sending squad representatives to fill squad canteens. Conduct at pumps and springs in canteen filling.

REAR GUARD DUTY

a. Formation under varied situations.

b. Action of rear guard patrols.

c. Selection and preparation of successive defensive positions.

d. Action of rear party in retreating before closely pursuing force.

e. Action of support in covering retreat of the rear party.

f. Action of support and reserve in withdrawing from defensive position and in taking up the retreat.

g. Action of the reserve in intercepting a rear flanking attack upon the main body.

Outpost Duty.

1. *The Main Body.*

a. Field lecture and demonstration on camp sites, kitchen sanitation, incinerators, location, construction and sanitation of rears, location and care of corrals, location of drinking, bathing and wash water, etc.

b. Interior camp guard duty.

c. Shelter tent pitching.

d. Pyramidal and wall tent pitching.

e. Communication with supports.

f. Quick turning out and forming under surprise and emergency orders.

g. Transmission of orders, inspection, preparation, etc., of special patrols sent out from main body.

h. Forced marching to reinforce supports.

2. *The Reserve.*

a. Location, formation and conduct. Relieving the supports.

3. *The Support.*

Demonstrations of:

a. Location and formation.

b. Support intrenching and defense preparation.

c. Communication with reserve and with pickets.

d. Support sentinels. Interior conduct of support.

e. Individual cooking.

f. Patrolling from the support.

g. Relieving the pickets.

h. Combat action of the support under varied situations.

4. *The Picket.*

Demonstrations of:

a. Location and formation.

b. Conduct and messing of the picket.

c. Patrolling from the picket.

d. Combat action under varied situations.

e. Night formations.

f. Communication with supports and with outguards.

g. Relieving the outguards.

h. Combat retiring upon the supports.

5. *Conduct of the Examining Post.*

a. Demonstrate.

6. *The Outguards.*

Demonstration of:

a. Positions and conduct of cossack posts.

b. Positions and conduct of sentinels, double sentinels, sentry squads.

c. Conduct of visiting patrols and of examining patrols.

d. Orders for sentinels of the outguards.

e. Communication.

f. Relieving the outguards.

g. Combat action under varied situations.

h. Combat retiring upon the picket.

i. Receiving the flag.

j. Receiving deserters.

k. Night changes.

March Outpost Duty

Demonstrations of:

a. Formation, posting, relieving, communication.

b. Combat action under varied conditions.

THE COMPANY IN DEFENSE

a. Practice of surprise deployments of the company from any formation in any direction.

b. Field lecture on selection of defensive positions, selecting and planning lines of intrenchments, dummy trenches, shelters and bomb proof trench quarters, communications and approaches, trench rears, etc.

c. Construction of intrenchments.

d. Construction of obstacles, theory and practice.

e. Location of detachments for flank protection and strengthening of such flank positions.

f. Interior communication.

g. Location of supports and use in combat.

h. Location of reserves and use in combat.

i. Estimation of distances and range finding.

j. Practice in pointing out and defining targets.

(The pointing out of company targets by company and platoon commanders and by squad leaders so that men are forced to direct their aim at the points desired is so difficult that much practice is necessary before facility is acquired. This work is so important that it should be practiced with great frequency.)

k. Distribution of fire of squads and platoons over targets. Shifting of fire.

l. Assigning of defense zones to platoons.

Maintenance of defense within zones.

Maintenance of observation within platoon defense zones.

m. Control of fire.

n. Conduct of prolonged defensive firing. Use of firing reliefs in squads, platoon and company.

o. Distribution of ammunition.

p. Receiving and repulse of bayonet charges.

q. Counter attacks by supports and reserves.

r. Interior communication.

THE POSITION IN READINESS

a. Problems requiring or justifying.

THE COMPANY IN ATTACK

Demonstrations of:

a. The approach from distant ranges.

b. The advance through artillery zones.

c. The advance through the mid zone under varied conditions.

d. The assignment of company and squad targets, and the communication of targets to individuals.

e. The use of combat patrols and ground scouts.

f. Range finding and estimation of range.

g. Interior and exterior communication and use of signals.

h. Opening fire. Rating of fire.

i. Practice squad rushes for speed and minimum exposure, especially at beginning and at end of rush.

j. Practice of platoon and company rushes.

k. Practice of attack with defense outlined with men equipped with red flags to give indication of fire superiority and to control the advance.

l. Combat action in meeting surprise fire of varied strength from varied positions, front and flank.

m. Preparation for the bayonet charge.

n. Practice squad, platoon and company bayonet charges for cohesion, team work and force.

o. Supplying and distribution of ammunition.

p. Reinforcing the firing line.

q. Reorganization of squads on the firing line.

r. Continuation of attack when various leaders are disabled.

s. Location, formation and use of supports.

t. Individual use of cover.

NIGHT MANEUVERS

a. Maneuvering in varied formations.

b. Preservation of communication and cohesion.

EXERCISES INVOLVING CAVALRY AND ARTILLERY

a. Field lecture, preferably with observation of cavalry and artillery at drill, on the powers, methods of action, and limitations of those arms.

b. Company in support of artillery.

c. Company in attack upon battery of artillery.

d. Attack upon cavalry.

e. Defense against cavalry under varied situations.

VII. GRAPHIC RECORDING AND MEASUREMENT OF PROGRESS

Qualifications of the individual should be recorded on a qualification card; for example:

INDIVIDUAL QUALIFICATION RECORD

Name..... Service.....

1. Manipulation of pack. Qual. 9/14/15. E. H.
2. Nomenclature, use of rifle. Qual. 10/8/15. E. H.
3. Gallery practice.
4. Range practice.
5. Manual of arms, etc.
6. Drill.
7. Interior guard duty.
8. Bayonet exercise. Combat.
9. Hygiene and first aid.
10. Signalling.
11. Marching.
12. Elements of field service.

Of considerable value would be comments on the back of the card relative to the possible use of the individual as a noncommissioned officer or instructor, date of separation from the service, residence, etc.

A special additional card should be made for recording the qualifications of those undergoing the tests of proficiency for noncommissioned officers. For example:

N. C. O. ADDITIONAL QUALIFICATION RECORD

Name..... Rank..... Service.....

1. Guide, close order. Qual. 12/8/15. E. H.
2. Guide and column leader, extended order.
3. Drillmaster and instructor.
4. Guard. Duties of N. C. O.'s.
5. Range finding.
6. Estimation of distance.
7. Patrol leading.
8. Elementary map making.
9. Rapid rough sketch making.
10. Rapid preparation of messages.
11. Map reading.
12. Signalling (flag, semaphore, bugle, firing line reserve).
13. Indication of field targets.
14. Field service duties of N. C. O.'s.

The following is an example of a squad qualification record card:

SQUAD QUALIFICATION RECORD

Squad No..... Leader.....

1. Close order drill. Qual. 6/10/15. E. H.
2. Extended order drill. Qual. 6/10/15. E. H.
3. Patrolling.
4. Fire direction.
5. Fire discipline.
6. Rushes.
7. Bayonet charges.
8. Pyramidal and wall tent pitching.

Of the greatest psychological aid in the qualification and standardizing of the company is the *index of instruction progress* of the individuals of the company. It is of especial value in the comparison of the progress of units and in the supervision of the training of units by higher commanders.

The index indicated is conspicuously posted, and its encouraging and stimulating effect upon the men will be very great.

Shaded squares indicate qualification. Height of total (black) column obtained by dividing total number of shaded squares by 12 (the number of subject columns).

VIII. Instruction of Defectives

Each company seems to have two or three deficient men, who are defective mentally, or who seem to be unable to coordinate their muscles, or who are defective in some way which prevents their qualification in the various branches of instruction. These men usually require more attention at drill than the entire remainder of the company. It is a very great waste of time and energy and efficiency to keep these men in the company for instruction. They should preferably be combined into a special regimental instruction detachment under a selected instructor, their deficiency carefully measured and recorded and, when their deficiency cannot be overcome in a reasonable time, their records should be referred to a board of officers for action.

IX. Development of Initiative

Standardization of methods of military instruction need not destroy initiative. Initiative might be encouraged and directed in the following manner: One company in the regiment commanded by selected officers of experience should be designated as the experimental company. All officers should be encouraged to submit ideas in writing, which should be referred to the experimental company for test and report. Worthy plans should be referred to higher authority.

Experiments should not interfere with the standardizing of the efficiency of the experimental company.

X. Programs of Instruction

The drill and work of instruction of each day should, of course, constitute a definite part of the work of developing *the standard company,* which is kept pictured in the mind of the commander and his assistants and the requirements of which standard are definitely determined.

At the end of the work of each week at least, the progress of the company toward the standard should be visible and measurable. There must therefore be a comprehensive system or plan outlining the general sequence of the procedure of the work.

To prescribe, however, a definite detailed program for long periods, stating the allotment of days and hours to each form of instruction, is generally unsatisfactory because:

1. The unforeseen exigencies of the service will not generally permit the carrying out of a long period detailed program.

2. The progress of development and the instruction needs of the company cannot be foreseen for long periods.

However, a general plan or program covering long periods or drill seasons should be prepared.

The instruction needs of the com-

pany can be foreseen for short periods, and a detailed program for at least one week's advance work can and should be prepared and followed with reasonable exactness.

In the preparation of programs it should be remembered that there are certain combat requirements which must be practiced with routine frequency in order that they may become habit and that in the excitement of combat they may not require concentrated thought. Their relative importance depends upon the probable character and nearness of a possible war.

The following routine exercises are suggested:

1. The march. (Over short courses for rating and cohesion.)
2. Practice loading with dummy cartridges.
3. Practice sight setting.
4. Fire direction and control.
5. Bayonet fencing and combat.
6. The bayonet charge. (Squad, platoon and company practice.)
7. Resistance to bayonet charges.
8. Use of pick and shovel.
9. Management of intrenching.
10. Estimation of distance.
11. Practice of signals and signalling.

Weekly programs should be filed with problems, changes, comments, etc., thus forming a valuable journal of instruction.

The details of each day's work should be most thoroughly thought out and prepared the day before, because impromptu work secures inferior results.

XI. Measurement of Period Required to Train and Develop an Infantry Soldier

Frequently the question appears, "How long does it take to develop and train an infantry soldier?"

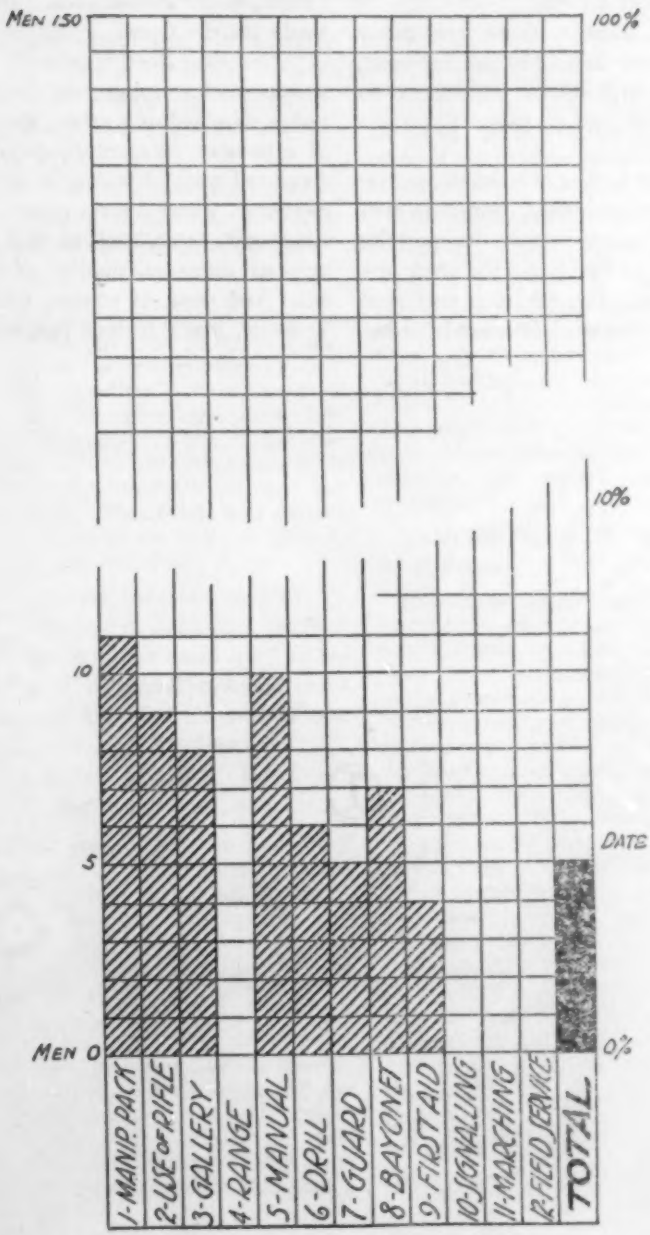
By the expression "trained infantry soldier" it must be understood that we mean the soldier ready to be sent to the front to endure the rigors of the firing line and to adequately meet its offensive and defensive requirements. It also must be very definitely understood that after standard qualification tests for the individual and for the squad there are tests for the platoon, and that all these units must be welded into a company of maximum cohesion and field combat efficiency. For example, the following are some of the things in which a company must qualify:

1. Standard efficiency in disciplinary close order drill and in extended order drill.
2. Deployment with maximum speed and efficiency from any formation in any direction.
3. Bayonet charge with maximum force, team work and cohesion.
4. Maximum efficiency in indicating and communicating an assigned target to platoon chiefs and in the further communication of their assigned targets to squad leaders and to individuals.
5. Maximum efficiency in response to fire control.
6. Maximum efficiency in distribution of fire over target and in shifting of fire.
7. Maximum efficiency, including control and team work in combat advances, rushes, etc., through all zones of the advance.
8. Efficiency in communication between the company commander and units of the company when separated by distance.

INDEX OF INDIVIDUAL EFFICIENCY

CO. " ", ST INF.

QUALIFICATIONS ONLY CONSIDERED



9. Efficiency in the mechanism in trench digging.

10. Efficiency in advance guard, rear guard, outpost duty, etc., and in all forms of field service.

Then, of course, there are many things that the battalion, the regiment, the brigade and the division must do with efficiency, and all these take training time.

Then there is that indefinable quality which the experienced inspector will require of troops before he permits them to go to the front for their supreme effort. The training must not have been a veneer. It must have become a part of their being and set itself into their bones; in other words, they must be "seasoned troops." If they are trained and seasoned, and *competently commanded,* they are ready for the front.

"How long does it take?" With a standard of training and development and a standard of method, the average of a number of carefully directed and measured tests should give an approximation. There are many factors which will enter, such as skill and energy of directors, quality of recruits, etc. And then, of course, there must be many, many trained instructors.

The Relation of Minor Tactics to War

By Major General Leroy S. Lyon

AN understanding of the meaning and scope of the word "tactics" can be obtained by locating its place under the more general subject, "The Art of War."

Legal definitions of war are found in many recognized authorities. Davis, in his "Elements of International Law," writes as follows:

War may therefore be defined as an armed contest between states or parts of states. It is undertaken by one state against another, for the *purpose* of *compelling* an offending state to fulfill its obligations as a party to international law. With the inherent *rightfulness* of war international law has nothing to do. War exists as a fact of international relations, and, as such, it is accepted and discussed.

This definition may be amplified by writing that war is a conflict between two nations, organized and used as instruments of regulated violence, with the object of imposing the will of one nation upon that of the other.

From "Rules of Land Warfare," 1914, War Department, we quote:

The development of the laws and usages of war is determined by three principles: First, that a belligerent is justified in applying any amount and any kind of force which is necessary for the purpose of the war; that is, the complete submission of the enemy at the earliest possible moment with the least expenditure of men and money. Second, the principle of humanity, which says that all such kinds and degrees of violence as are not necessary for the purpose of war are not permitted to a belligerent. Third, the principle of chivalry, which demands a certain amount of fairness in offense and defense and a certain mutual respect between opposing forces. "*The object of war* is to bring about the complete submission of the enemy as soon as possible by means of *regulated* violence."

Von Moltke said:

The greatest kindness in war is to bring it to a speedy conclusion. It should be allowable, with that view, to employ all methods save those which are absolutely objectionable. The weakening of the military forces of the enemy is not the only lawful procedure in war. You must attack all the resources of the enemy's government, its finances, its railways, its stores, and even its prestige.

From the "Laws of War," 1914, we learn that—

Military necessity admits of all direct destruction of life or limb of armed enemies, and of other persons whose destruction is incidentally unavoidable in the armed contests of war; it allows of the capturing of every armed enemy, and of every enemy of importance to the hostile government, or of peculiar danger to the captor; it allows of all destruction of property, and obstruction of ways and channels of traffic, travel or communication and of all withholding of sustenance or means of life from the enemy; of the appropriation of whatever the enemy's country affords that is necessary for the subsistence and safety of the army, and of such deception as does not involve the breaking of good faith, either positively pledged, regarding agreements entered into during the war, or supposed by the modern law of war to exist.

Having defined *war*, its object, the three principles from which the laws of

war are developed, and *what may be done* by reason of military necessity, a definition of the "Art of War" is next in order.

In a broad sense the art of war is the code of principles and rules of practice employed by statesmen and military leaders in enforcing the will of the nation.

The following quoted description of the object of the art of war expands and explains the four subdivisions of that art, viz: strategy, tactics, logistics, and military engineering.

Military science or "The Art of War" has for its object: first, to determine the time, place and character of battles and conflicts so that the greatest benefits may result from victory and the least injuring from defeat; second, to make oneself stronger than the enemy at the time and place of actual combat. The first of the objects is accomplished by strategy, including logistics; the second by logistics, discipline, grand and minor tactics, and military engineering. None of these branches can be practiced, or even intelligently studied separately, nor can one be rated as of higher value than the others, since ultimate success must depend upon them all. The highest strategy accomplishes nothing unless the logistics and tactical arrangements for success in battle are satisfied. The best tactical arrangements and actions may result in victories entirely barren, even sometimes worse than defeat, owing to faulty strategical dispositions; while a failure in logistics will, of necessity, destroy all strategical and tactical combinations.

To show more clearly the relations of those subdivisions to the objects of the art of war, it is only necessary to call attention to the fact that whether or not the "greatest benefit will result from victory and least injury from defeat" will depend upon the positions of the opposing armies with reference to each other's communications, lines of retreat, and objectives before and after conflicts, the moral and political effects produced by the results of battles, and the times of their occurrence. These considerations evidently involve questions of strategy, including statesmanship, both in planning campaigns and forecasting their results, and logistics in preparing for the execution of the plans.

The second object will be accomplished to a greater or less degree: first, by rapidity of concentration, giving a greater number of men at the place of actual conflict; second, by better arms, ammunition, and supplies, better defensive arrangements, better training and discipline, or better handling of the masses or small groups, making the same, or a less number of men stronger than the hostile force; third, by localizing the conflict upon a point where this superiority exists. The first is a question of logistics; the second of logistics, engineering, discipline, and grand or minor tactics; and the third of grand and minor tactics depending upon the force employed.

Tactics may be defined generally as the art of so handling bodies of troops, large or small, as to utilize to the fullest extent the fighting, maneuvering and resisting capacity of every individual, weapon, and resource of all arms of the service. When applied to the combined action of large masses made up of different arms, it is called *Grand Tactics*. When restricted to the actions of small bodies or single arms, it is called *Minor Tactics*. This division is general and not well defined, since the two run imperceptibly into each other.

Logistics embraces all the details of moving and supplying armies. It is essentially the province of the staff, and its different branches are apportioned to the different staff departments.

Strategy has for its object to inaugurate and conduct wars, campaigns, and battles, as, first, to take advantage of all available means for securing success; and second, to cause the greatest benefits to result from victory and the least injury from defeat. Under the first heading it involves questions of statesmanship and diplomacy. Under

the second it is more frequently concerned in the moral effect to be produced by a battle, resulting, in case of victory, from the absolute losses inflicted upon the enemy or the disadvantageous positions in which he may be placed with respect to his bases of supply and lines of communications, and, in case of defeat, from the corresponding losses of our own army.[1]

Having defined the art of war and its four subdivisions, the next question is how best to acquire a detailed knowledge of the art, and how to apply the principles in campaign. A moment's consideration will convince the student that actual experience in warfare, though valuable, is not essential to its successful prosecution. Veterans were not available for the leadership of the German military machine in August, 1914. The War of 1870 was too remote to furnish the number and youth necessary for the year 1914. The youth of twenty in 1870 had reached the retiring age of sixty-four in 1914.

The German general officers and staff officers were developed by years of study and practice. Organization, strategy, grand and minor tactics, logistics and military engineering were the subjects that engaged their attention. Not local politics, commerce, trade, the law and the pulpit. They became conversant with the broad policy of their country, read and reflected upon such subjects as military and political geography, the history of the art of war. They wrote strategical plans, solved tactical problems, studied the art of supply and transportation. The solution of problems was on maps, by war games, by terrain exercises with and without troops, by great field maneuvers involving divisions and corps.

We, without this background of study and experience, must start on an intensive course, at short notice, and with but little time, in the subject of Minor Tactics.

DIAGRAMMATIC DEFINITIONS

WAR: Organized, regulated violence.
OBJECT: Complete submission of the enemy.
MEANS: Application of force, limited only by humanity and chivalry.

ART OF WAR (Code of principles and rules of practice used to enforce the will of the nation. Often violated by military genius.)

- 1. STRATEGY
  - Organization and dispositions preceding contact.
  - Statesmanship, diplomacy.
  - Moral effect on nation and enemy.
- 2. TACTICS
  - Disposition after contact.
  - *Grand Tactics:* Combined actions of large masses of different arms.
  - *Minor Tactics:* Actions of small bodies or single arms.
- 3. LOGISTICS
  - Details of moving and supplying armies.
  - Includes
    - Service of the interior.
    - Service of the theatre of Operations
      - Service of line of communication
      - Service of zone of advance.
- 4. MILITARY ENGINEERING
  - Field and permanent fortifications.
  - Defense lines.
  - Military railways, bridges, etc. Topography—maps, etc.
  - Demolition, mining, obstacles, forestry, camouflage.

[1] James Mercur, Colonel, U. S. A., Professor of Civil and Military Engineering, U. S. Military Academy.

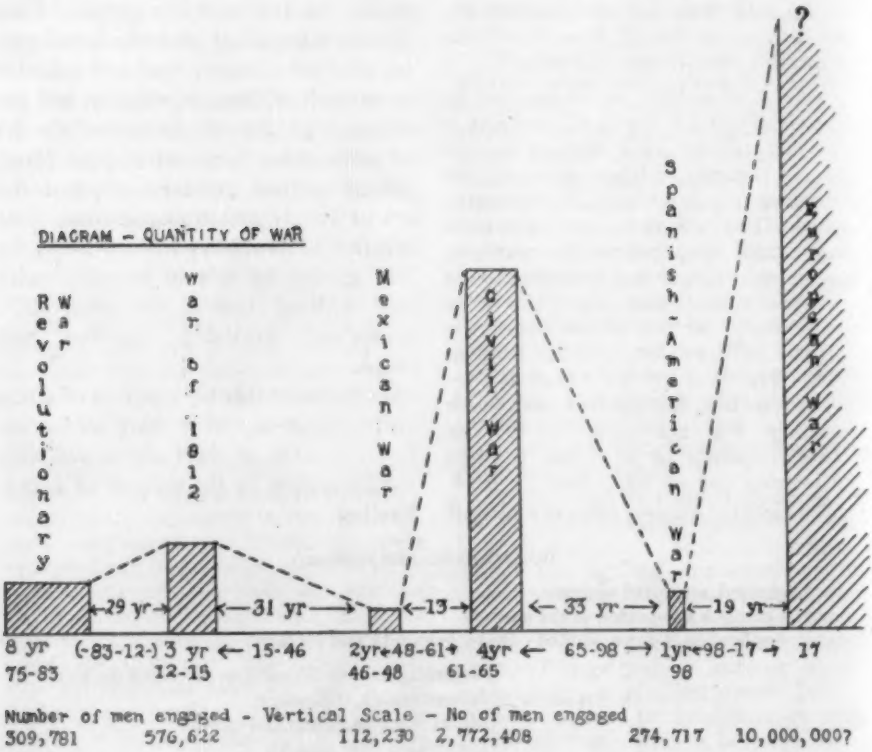


DIAGRAM – QUANTITY OF WAR
Revolutionary War
War of 1812
Mexican War
Civil War
Spanish-American War
European War
?
←29 yr→
←31 yr→
←13→
← 33 yr →
←19 yr→
8 yr (-83-12-) 3 yr ← 15-46 2yr←48-61→ 4yr ← 65-98 → 1yr←98-17→ 17
75-83 12-15 46-48 61-65 98
Number of men engaged - Vertical Scale - No of men engaged
309,781 576,622 112,230 2,772,408 274,717 10,000,000?

Cavalry and the Aeroplane[1]

By Major J. R. M. Taylor

IT HAS been well said that a fog envelops the theater of active operations through which the leaders see but dimly. Since the organization of modern armies, the most important duty of cavalry has been to penetrate this fog, and, although in some rare cases, by passing completely in rear of the enemy, horsemen have been able to locate within narrow limits where the fog lies, yet in by far the greatest number of cases, even when the cavalry has been admirably led and has accomplished everything which was hoped of it, it has only succeeded in ascertaining where the fog lay densest. In other words, and laying metaphors aside, it has been able to locate the heads of the marching columns of the enemy. To obtain this most important information in all armies, an expensive and delicate arm of the service has been maintained. It cannot be denied that the cavalry is a most delicate and complicated weapon. Every service journal which we open tells us so, and the information is conveyed in no uncertain terms by experts, by the officers of cavalry themselves who, if any men, should know. We have all read of the years which it takes to make a cavalry soldier, of the arduous and untiring efforts required on the part of his officers, and we who are not in the mounted arm and who, when we ride, are apt to do so on horses which have been condemned as not sufficiently gentle for mounted troops, wonder how any cavalry officer, when so much is dependent upon his continued presence, dares, on detached service, to be absent from his charger.

Cavalry has two functions—to screen a movement and cover a position, or to occupy a line which cannot be reached by infantry on account of its inferior mobility. Other duties it has, but they are subordinate to these, and in this discussion it is not necessary to consider the amount of preparation necessary for the thundering charge which sweeps the shrieking and broken infantry from the field of battle.

Since Agincourt, infantry has grown steadily less and less willing to break, and, with the improvements in firearms, more and more has their retreat been that of the wounded grizzly, dying perhaps but dangerous to the last. The second of the two functions can be performed by cavalry, but every mounted officer who believes that horsemen can go anywhere and do anything and who hopes that some day even he may have the chance of leading a squadron against battleships, as once happened on the *Texel*, feels that it is but a secondary duty, better fitting dragoons or what are singularly inappropriately called mounted infantry.

Cavalry, properly speaking, is composed of excellent horses, ridden by good horsemen, who can travel fast and far, see everything on or near the line of march, fight if necessary, to see and return in such condition that their commander will, if necessary, be able to repeat his exploit. That, I take it, is the ideal, and any amount of money, of

[1] Reprint from INFANTRY JOURNAL of July, 1909.

labor and of thought expended in organizing and maintaining a force of cavalry capable of doing what Stuart did when he rode around McClellan's army in the peninsula would have been well repaid. Its commander, dismounting to report, could feel that he had not scorned delights and lived laborious days in vain. But that was yesterday, and the world moves so fast now that yesterdays are far astern. Of course, it is too much to ask members of the most conservative of all professions to recognize immediately that yesterday is not today, but I think that it may be of some interest to ask whether the qualities of a cavalryman, which cannot be improvised, which, according to cavalrymen, require long, arduous and unremitting training, do not belong to the cavalryman as opposed to the dragoon, and then ask whether the cavalryman, the man of the fast horse, the man who can go anywhere and see anything, the man who would rather jump a gate than open it, is not obsolescent?

Of course the question would be met with a storm of indignant denials. We all know what the American cavalry would have done in China if more than one troop had gotten there before Peking was occupied. We all have heard of the marvelous things which the Russian horsemen should have done and did not do. We know that never before in the history of war has speed been as important because distances have never been as great, which should mean more men on faster and more enduring horses . . . but, gentlemen, the aeroplane has arrived.

I lately read the admirable life of Stonewall Jackson by Colonel Henderson, and in reading it I was interested in considering the probable effect upon his far-reaching combinations of the possession by the federal generals of an aeroplane able to travel for two hours at 30 miles an hour. If the Wright machine cannot do that now, it will do it very shortly, and new types, each an improvement on its immediate precursor, are rising into the air all over the world. Twelve years ago it would have taken a strong imagination to see in the tiny machines which squeaked and gurgled in the streets of Paris the advance guard of the procession of automobiles which now sweeps along every highway of the world. The aeroplane is at least as far advanced as the automobile was then, and its rate of development will probably be faster. We are assured that three years is all too short a time to train a cavalryman. May not the end of his training find his most important function, the obtaining and rapid transmission of information, in the abler hands of the navigator of the air?

If the War of the Rebellion were to be fought over this year, the principal field of operations would still be Virginia, and the defense of Washington would still be the determining factor in the plans of the government of the north. It is possible that a Lee and a Jackson would be found at the head of the armies on one side of the Potomac, while it is possible that McClellans, Popes and even Burnsides would be chosen to oppose them. The roads of Virginia may have improved in forty years, but men who march over them would doubt it. There are some clearings where then there were forests, the railroads are better than in 1862, and there are more accurate maps of the state. These are the changes, but the

natural features which so largely determine strategy, the policies, the political necessities which determine grand tactics would still be the same. The capture of Washington by the southern armies would still mean the recognition of the Confederacy and possibly foreign aid, while the capture of Richmond would mean the fall of the Confederacy. The side which controlled the sea would still be able to divide into sections the hostile territory, while the armies holding the portion of the country between the Potomac and the Alleghany Mountains would still have the advantage of interior lines. Infantry would march no faster, cavalry would be no more swift today than forty years ago, and while the problems of supply could be more easily solved, yet the needs of the men to be supplied are more complicated and various than they were in the past. While the field of strategy would be almost unchanged, the field of tactics would be less altered than would appear at first glance. The influence of the increased range of firearms has been a dissolving influence, and yet it is quite possible that the plan of one of the battles of the Civil War, if fought again by the same generals today, would be the same, except that distances and perhaps intervals would be twice as great.

It is accordingly possible to imagine a 1909 McClellan in front of another Lee who holds Richmond and prepares it as a pivot of maneuver, while another Magruder behind a line of works confronts the federal army and holds it in place until his commander is ready to attack its flank. There is no good reason to believe that infantry reconnaissance would be more effective than it was forty years ago. Patrols would certainly be much longer under fire. The cavalry of today are no better riders than they were then, and they, too, would be longer under fire and could penetrate no farther through the dense lowland growths than the cavalry of the army corps of the peninsula campaign. But suppose that McClellan received an aeroplane costing about as much as the horses of a squadron of cavalry and independent both of mud and forage, an aeroplane such as I have described—new, imperfect, far inferior to the one of three years hence, but of a type which already exists and flies—his vision, in place of being limited by the earthworks in front of him, would immediately extend to Richmond. Of course, a machine of the present type would be riddled with bullets the moment it appeared above the hostile lines in the daylight, but it would not appear in the daylight. Suppose that it is seen at night; suppose that it is heard? It will not have to fly down the column of an army. It will have to cross it only or to pass along a flank to see the fires of an army corps stand out like the lights of a town. Where a town is there will be lights at night. If there are fires where no town is given on the map, there troops must be encamped.

An army must cook, during much of the year it must warm itself, and from overhead the size of an army will be judged as is the size of a city—by the number of the lights.

On the night of June 24, 1862, 68,000 Confederate soldiers were south of the Chickahominy holding the works which covered Richmond, while less than 2 miles eastward and only some 7 miles from Richmond lay four of McClellan's army corps, in round numbers 75,000 officers and men. North of the Chicka-

hominy a federal corps of 25,000 men had been pushed forward. Some 12 miles to the northwest of it was Stonewall Jackson's corps of 18,500 men. During the night of June 25, Lee massed 59,500 men on the north bank of the Chickahominy, leaving 27,000 in front of Richmond to hold McClellan's 75,000. On the morning of June 26 he fell upon the corps on the north bank and next day forced it across the river. Then followed the seven days of battle, at the end of which McClellan lay behind his entrenchments at Harrison's Landing, while the people of the north shook from them their dream of ending the war in one campaign and prepared for long and cruel hostilities. McClellan had at this time a force of cavalry, small, it is true, compared with the size of his army, but he had 5,000 sabers, and the Confederate flanking columns moved within a radius of 10 miles from the federal corps on the north bank and moved without the true meaning of their march being understood by McClellan. But if an aeroplane had swept over those columns halted in position, had swept over them before dawn and had seen their cook fires, which were probably started at 4 in the morning, no detailed information of the location of individual units would have been necessary. The lights would have shown that the greater part of Lee's army was concentrating on the north bank of the Chickahominy, and McClellan, slow as he was, cautious as he was, once the turning movement was well under way, would, with at least 70,000 men, have struck straight at Richmond. It is true that with twice as much cavalry at his disposal he would have sooner learned the true meaning of the movement which was taking place to his front and right, but twice as much cavalry would have given him no more certain information than one aeroplane and would by no means have given it as quickly.

At Manassas, Lee had hardly more than 50,000 men of all arms. Jackson had 17,000, Longstreet 30,000, and the cavalry was 2,500. Pope had 100,000 men, and his army could easily have been reinforced to 150,000. In the movements preparatory to battle, Lee moved his army in two wings, separated by two days' march, and won. Not only was Longstreet's movement screened by the mountains but by his cavalry; still Pope had 10,000 cavalry when he allowed Jackson to hold him until Longstreet had finished his march. It is true that Pope was not a great general; it is possible that if his cavalry had been in better condition and if it had been better handled it could have obtained and transmitted a portion of the information which today one aeroplane could easily procure. Cavalry might have beaten in the advance guard of the marching column, cavalry might have learned that for so many hours the dust of marching troops had hung above certain roads, but the aerial scout dispatched by Pope would have come back in hardly more than an hour and reported that beyond the black masses of the mountains there glowed that night the camp fires of a hostile army.

Wars are not over. If all the great issues have been answered by the touch of swords, there are still writs of ejectment to be served on governments which neither rule nor keep their houses clean. It is possible that before universal peace comes, the peace which will be founded not on love between the nations but on a great fear, aerial navies may battle in

mid-air, but they will hardly sail forth to war in our time. No dirigible balloons will disembark an effective landing party, and if the first line, far-seeing and far-flying, is high above our heads, it must be followed close, if war is not to be mere destruction, by battalions and by guns. There will be armored automobiles with the vanguards of those columns, there will be dragoons with those armies, men who have been taught as infantry and who still remember how they rode the mules and farmhorses back at home. And in that time, and it has already dawned, there will be no place for the cavalryman who requires one or two enlistments to fit him for what the cavalryman of the cavalry screen must do. Why not admit that with the advent of aerial navigation he has become a picturesque survival like the halberdiers who line the royal staircase at the coming of the King of Spain?

Theory of Fire

Study by The School of Musketry, Fort Sill, Oklahoma

Introduction

THE object of all musketry training is to increase the fire efficiency of troops, which is known to depend upon two general classes of factors —those which may be grouped under the heading "Moral" and those which may be grouped under the heading "Physical."

It matters little how skillfully a group of men may shoot in time of peace and on the target range, if when called upon to fire in battle they are so nervous, frightened or fatigued, that they cannot aim their rifles nor discharge them with any degree of their one-time skill. Therefore a part of the soldier's training in musketry is designed to reduce this moral factor to its minimum. Nervousness arises in part from unfamiliarity, hence the soldier is taken through countless maneuvers, combat problems and field firings so that, when called upon to fire in battle, he will find himself doing the same routine things he so often practiced in peace. Fright is an emotion common to all at times, but in the soldier fright most often results from lack of food and rest, lack of confidence in his leaders and in himself, strangeness of sights and sounds, etc., rather than from the presence of actual danger; hence we strive even in the stress of combat to provide rest and food and in time of peace to instill into each man a confidence in himself and in his leaders and a familiarity with the sights and sounds of battle. We also strive to fortify him against fatigue by giving him a certain amount of physical training, so as to reduce the evil effects of fright and fatigue as much as possible. However, in spite of all the training that we can and do give, the moral factors are and always will remain the most important and moral factors will ever exert a greater influence upon the war efficiency of our fire than all of the physical factors combined. The physical factors are controllable both in peace and war and every effort is made to keep them at a minimum. These factors are the rifle, its ammunition, the individual skill in marksmanship of the men and the collective skill of the units in musketry and fire tactics.

For an efficient rifle and an abundant supply of good ammunition we look to our supply departments and for the training in musketry and marksmanship to our own efforts, the keynote of our system being the breeding of confidence.

Confidence of the man in himself and in his rifle is built up by individual practice in shooting. If this elementary and important factor is neglected or slighted it will be made manifest on the field of battle by its ugly fruit. Marksmanship deals with this subject of individual fire.

Confidence of the man in his companions and leaders is built up by a knowledge that the other men in the unit can shoot singly or in a fire unit and this knowledge comes from constant practice in combined shooting.

Neglect of this factor is not less fatal than the other and often leads to a defeat where victory might have been grasped. Musketry deals with this subject of combined or massed fire.

Together these two confidences breed the full confidence which is essential to efficiency—Battle Confidence.

To create the individual confidence the soldier is taken through the prescribed S. A. F. M. course of individual instruction and firing. If at the end of this course the soldier has not confidence in himself and his rifle the fault will lie with his instructors, for it is their duty *to create this confidence,* not merely to take the soldier through a prescribed course and then abandon him to his fate. If you undertake to instruct a soldier in this part of his training, keep in view always that the object is to make him so good a shot that he will always feel sure of himself when he lays his sights on a hostile target. To create the confidence of the soldier in his companions and in his leaders requires that all soldiers shall be given abundant practice in field firing so that they may accustom themselves to shooting at a battle target and overcome the natural tendency to expect a higher percentage of hits than should reasonably be expected against such targets. By such exercises fire discipline is built up, experience is gained in fire control and the leaders acquire a practical knowledge of fire direction.

Efficient fire direction comes from a thorough knowledge of the theory of fire, for the fire director works with a most powerful and flexible medium—the fire of the modern rifle—and he should be a master of this medium, being able to gauge its powers and to recognize its weaknesses.

He must know when it is profitable to fire and when it is not profitable. He should know how to increase its efficiency when necessary according to the particular local conditions surrounding a concrete case.

There is only one way in which intelligently to study the theory of fire, *i.e.,* to take each factor and weigh it against the other factors one by one and all together until we can assign to each its proper relative value, learn which are negligible and which are important and learn how to reduce the evil effect of factors which, uncontrolled, would reduce the efficiency of the fire. This study is based on the theory of probabilities, the mathematical basis of which it is not necessary to explain in this pamphlet but which has been abundantly proved to be correct. All of the figures and results given in the pamphlet have been determined by this theory where they are not the result of actual firing. They are, therefore, dependable and the deductions drawn from them are sound.

LESSON I

The Trajectory and Sheaf or Cone

The curved path described by the bullet in its flight through the air from the muzzle of the rifle to the point where the bullet strikes is called the Trajectory.

In order that the individual soldier may make the best use of his rifle when he is using individual fire, that is, fire opened by individual soldiers without orders from a fire unit commander and where each one fires individually, selecting his own target, estimating his own range and regulating his fire according to his own judgment, it is essential that he know something of this path or

curve of the bullet through the air and the forces that affect the shape of that path.

Given two opposing individuals in combat, and the one that thoroughly understands the ballistic qualities of his rifle has the advantage of one that does not.

Of the forces which act on the bullet before it leaves the barrel of the rifle the soldier has little to do. These, however, may be pointed out to be the ammunition, rifling, etc.

The rifling directly affects the trajectory, after the bullet has left the barrel, by enabling the elongated bullet to be used instead of the round ball of former days. The advantage of this bullet over the round ball is that the long pointed bullet has great weight in comparison to the surface directly offered to the air. The combination of the rifling and the long bullet also gives the bullet stability or steadiness of flight and increases the accuracy of the arm.

Ammunition is discussed slightly later on.

The forces which primarily affect the shape of the trajectory are (1) the Explosion of the Charge, with its resulting initial velocity, (2) the Angle of Departure, (3) Gravity, and (4) the Resistance of the Air.

To discuss each of the above briefly:

(1) THE INITIAL VELOCITY

The explosion of the charge drives the bullet forward and causes it to leave the muzzle with a very high rate of speed. The rate of speed with which the bullet leaves the muzzle is called the *Initial Velocity*. Actually the point at which the initial velocity is measured is some little distance in front of the muzzle, but for all practical purposes the above statement is correct.

The service ammunition is loaded with a charge of powder which gives 2,700 feet per second muzzle velocity when fired from a standard Springfield rifle with selected bullets, the powder being at a temperature of 70° F. That is to say, this bullet would travel 2,700 feet in the first second if the rate of motion remained unchanged.

(2) THE ANGLE OF DEPARTURE

Every soldier knows that elevating the muzzle of the rifle causes the bullet to go higher in the air and as a result go farther. This elevating the muzzle by raising the slide on the leaf sight and sighting at an object causes the bullet to leave the rifle not along the line of sight but above that line. This angle made by the path of the bullet with the line of sight is called the angle of departure.

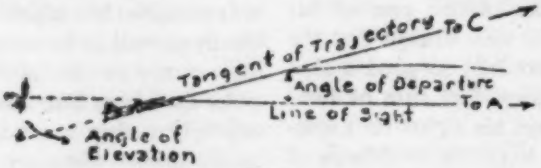


FIG. 1.

(3) GRAVITY

Gravity is the natural attraction which draws all unsupported bodies towards the center of the earth with ever increasing speed. This attraction commences to act on the bullet the moment that it leaves the muzzle of the rifle barrel.

(4) THE RESISTANCE OF THE AIR

The resistance of the air tends to stop the bullet in its flight, shortens the trajectory, and makes the point of strike lower on a vertical target or indirectly shortens the range.

In order to allow for the fall of the bullet owing to the force of gravity, it is necessary to direct the line of departure as much above the object to be hit, as the bullet will fall below it in any given distance if the axis of the barrel is pointed at the mark. The rifle is provided with a sight which permits the soldier to keep in sight the point that it is desired to hit while the muzzle of the barrel is elevated.

In the sighting of rifles a mean graduation for each range has been adopted and a high standard of accuracy for all practical purposes is thus obtained. Each rifle is carefully tested before issue but it must be understood that no two rifles behave in exactly the same manner and that if compensation could be made for every error in sighting of the rifle before issue, the wear of parts and the loosening and tightening of screws, etc., would bring about faults from time to time which would affect the shooting of each rifle differently.

Each man then should understand the shooting of his own rifle.

Other important points to consider in shooting are the following:

The jump of the rifle, drift of the bullet, fixing bayonets, use of gun sling, and rests.

The jump of the rifle: Owing to the shock of discharge a vibratory or wavy motion is set up in the barrel, which slightly affects the line of departure of the bullet as it leaves the barrel which is known as the jump. The causes and extent of this jump are not within the province of this study as it is allowed for in the sighting of the rifle.

The drift of the bullet is the lateral deviation of the bullet after it has left the barrel. This drift in the rifle is to the right and is due to the right hand rifling of the barrel which causes the bullet to twist in that direction. The drift is automatically corrected by the rear sight.

Fixing the bayonet to the rifle affects the trajectory by checking with its weight the jump of the rifle. This is why with the bayonet fixed the shot is usually low.

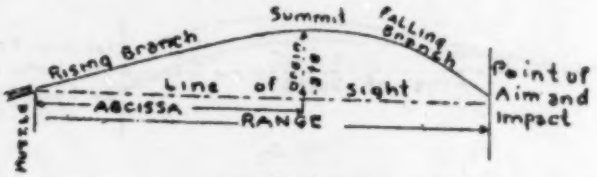


FIG. 2.

Rests: For practical purposes the shooting of the rifle is not affected by resting the muzzle or any portion of the stock lightly on earth or other substance. If, however, a rest is used for two successive shots the rest should be applied at the same point at each shot or the point of strike will be different.

The first shot from an oily barrel is usually erratic.

For the purpose of discussion it is necessary that the student understand the names of the different parts of the trajectory. These are shown in Fig. 2.

Under the combined effect of the influences just discussed, the trajectory when firing with a horizontal line of sight first rises above the horizontal with a scarcely perceptible curve to a point a little more than half way to the target called the *summit,* beyond which point it curves downward with ever increasing curvature until it strikes the target or the ground. The point where the line of sight meets the target is called the *point of aim,* and that where the bullet (trajectory) meets the target is the *point of impact.* Theoretically, the point of aim and the point of impact should coincide; practically because of some one or more of the influences discussed, they seldom do. The greater the skill of the marksman and the greater the perfection of the arm and its ammunition, the more often will the two points coincide.

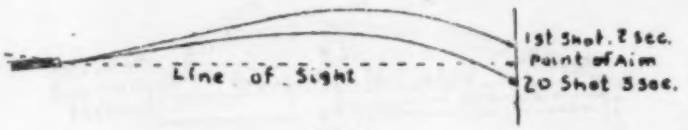


FIG. 3.

It is with the falling branch of the trajectory that the student is most concerned as it contains the target and the ground in its vicinity.

THE SHEAF

All soldiers who have fired a course on the target range understand that due to some causes no two successive shots fired under apparently exactly the same conditions ever hit the same spot. These different points of strike are brought about in a general way by (1) the difference in ammunition, (2) difference in aiming and holding, and (3) the changing atmospheric conditions.

Ammunition:

The service ammunition will give a muzzle velocity of 2,700 = 20 feet per second when fired on a normal day (70° F.). This velocity will vary directly with the temperature (T), 1.5 feet per second per degree. So that this ammunition fired on any but a normal day will give a muzzle velocity of 2,700 = 20 + (T — 70) 1.5 feet per second.

Place a chilled cartridge in a rifle and fire it. The powder will burn slower. The initial velocity will, therefore, be lower and the shot will strike low. Place a heated cartridge in the rifle and the rate of combustion will be increased, the initial velocity will be higher, and the strike will be high. This is one of the reasons why we overshoot in summer and undershoot in winter.

As two cartridges are never mathematically identical in the amount of moisture the powder has absorbed, the weight of the charge and temperature, two shots fired under seemingly the same conditions will never strike the same point.

Aiming and Holding:

Of much greater importance than changes due to ammunition are the unavoidable differences made by the firer in the angle of elevation.

On account of the imperfections of the human eye, the lines of sight of successive shots are not identical; that is, are not directed at the same spot, so that the point of aim varies with each shot (error in aiming). As a result of the shock of discharge, the position of the axis of the bore changes, with reference to the line of sight at the

moment that the bullet leaves the muzzle and the mount of this change varies with each shot. In addition to the jump and the errors in aiming are the errors in holding; that is, the errors which are caused by the firer's inability to keep the line of sight correctly directed at the moment of discharge, and to keep the plane of the trajectory perfectly vertical. Each of these disturbing factors causes differences in the angle of departure of successive shots, and this is one of the most important reasons why successive shots under seemingly similar conditions do not strike at the same point.

The Changing Atmospheric Conditions:

The density and movement of the air affect the amount of resistance of the air. The denser the air, the greater the resistance. A high temperature, a low barometer, and dry air all tend to decrease the density of the air, and so to reduce the air resistance.

In summer we generally overshoot and in winter undershoot, because hot, dry air is more often met in summer than in winter. The effect of the wind increases as its velocity, and depends upon its direction. A side wind causes the bullet to move sideways; blowing into the face of the firer, it increases the resistance of the air, and blowing in the direction of the fire, it reduces the resistance.

Hence in a number of successive shots there are a number of trajectories and

A cone containing all the trajectories of a series of shots fired by an individual with the same rear sight setting and the same aiming point is called the individual sheaf or cone of trajectories. When the firing is by a body of men it is called the collective sheaf.

LESSON II

The Shot Group

It has been shown that no two successive shots fired by the same individual with the same sight setting and the same aiming point would strike in exactly the same spot.

If a rifle is fired a great number of times under conditions as nearly uniform as it is possible to make them, the rifle being fired from a fixed rest so as to exclude the human errors of incorrect

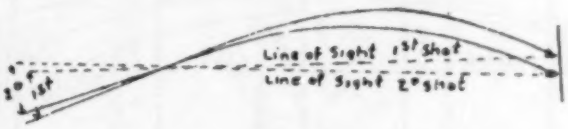


FIG. 4.

sight setting, holding, etc., the bullets striking the target will group themselves into a circular or elliptical group whose dimensions and shape for any gun vary with the distance of the target from the firer.

At the muzzle all of the bullets will, of course, pass through the same point.

If a paper screen is placed 100 yards in front of the muzzle, it will be perforated by all of the bullets within a circle 4 or 5 inches in diameter.

At 200 yards, the circle inclosing the shots will be about 10 or 11 inches in diameter and so on, the circle constantly increasing in size with the range.

The more nearly perfect the gun and ammunition, the smaller will be the size of these circles and the sheaf.

The central point about which the projectiles group themselves is the *center of impact.*

A line connecting the centers of impact of all circles is called the *mean trajectory.*

As the mean trajectory is the average trajectory, it is computed or determined for the service rifle and is simply called the *trajectory.* All ordinates are computed to this mean trajectory, and the angles of fall and departure refer only to it.

The pattern on the target made by all of the bullets is called the *shot group.* If received on a vertical target, it is a *vertical shot group;* if on a horizontal target, it is a *horizontal shot group.*

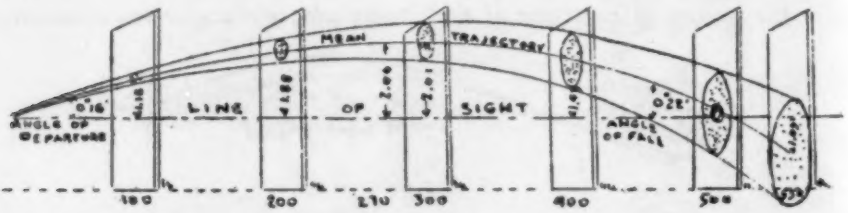


FIG. 5.

The individual soldier in firing on the target range gets the center of impact and his shot group as in A, Fig. 6. He therefore makes his correction to get the shot group in the target as in B, Fig. 6.

Since the angle of fall is known, the size and shape of a vertical shot group or any part of it can easily be converted into a horizontal shot group and *vice versa.*

Of all the deforming factors those discussed under the title "Angle of Departure" are the most potent, and it is only by diligent training and practice that these "human" errors can be reduced. The soldier is, therefore, taught to shoot, aim, and hold accurately, so as to form as small a sheaf as possible, and the officer is taught how to direct this small collective sheaf so as to assure the highest returns in killed and wounded for the excellence in marksmanship of the soldier.

It is the collective fire of masses of men that must occupy the attention of the officer in war.

However instructive as an elementary study an inquiry into the niceties of shooting—the accuracy of a single gun, etc.—may be, the officer must understand the effect of fire of masses of men in war. It is for this reason that so much study is spent upon an investigation of the characteristics of the collective sheaf which in the remainder of this text will be termed simply, "the sheaf," "*collective* sheaf" being understood.

INFLUENCES AFFECTING THE SHEAF

When, instead of one rifle fired 100 times and from a rest, we fire one shot each from 100 rifles held by men as in actual service shooting, the size of the sheaf becomes very much larger. The better trained the marksmen are (that is, the "closer" they shoot) the smaller the sheaf will they produce and the smaller the resulting group.

It has already been pointed out that whenever a number of shots are fired at a target the shots are symmetrically grouped about the center of impact and the cause of the dispersion has been

shown to be the variations in initial velocity, density of the air, and the difference in the angle of departure.

As these deviating influences act longer on the bullet at the long ranges than at the short, it follows that the size of the shot group will be greater at the long ranges. Therefore the deviating influences are due to two kinds of errors, the unavoidable, due to the rifle itself, and the human.

The human and unavoidable errors are those of sighting, etc. (angular), and these are most important at the short ranges, where the effect of the unavoidable errors is relatively unimportant. The reverse condition is observed at the long ranges, where the size of the sheaf and shot group is affected to a great extent by the unavoidable errors, and is influenced only in a minor degree by the human errors of sighting.

The reason for the difficulty of making a good score at the long ranges is, then, not one of sight, but of judging the character and amount of the *meteorological factors,* since the same correctness of sighting which insured a high score at 300 yards will not insure (and indeed will scarcely affect) the score at 2,000 yards.

The more highly trained the marksman and the more perfect the rifle, the smaller will be the sheaf produced.

If this sheaf is properly directed so that the center of impact is in the center of the target, a very much higher percentage of hits will result than can be made by poorer marksmen with their larger sheaf, for the experts will put all of their bullets in the target, while the squad of poorer shots is making some misses. (Fig. 7.)

If the center of impact is not properly placed, for example, if it is a foot or so above the target, the close shooting experts will miss the target while the poorer shots are still getting some hits upon the target. (Fig. 8.)

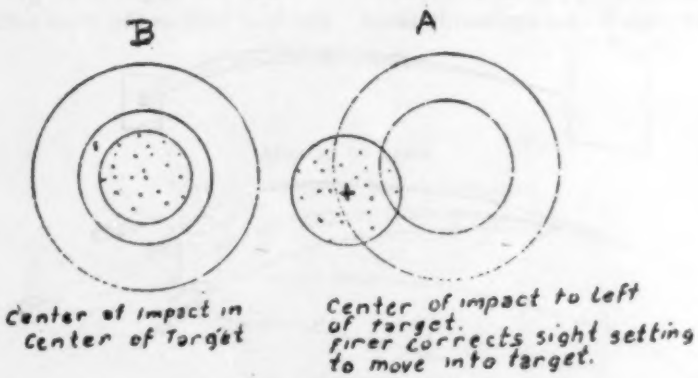

B
A
Center of impact in Center of Target
Center of impact to left of target. Firer corrects sight setting to move into target.

FIG. 6.

The above statement is not to be construed as an argument against the training of men in marksmanship, as it is to be remembered that under the influences of battle the dimensions of the expert rifleman's peace sheaf will probably fall to that of average marksmen in peace, while that of average marksmen may reach such proportions as to be of no value in war. With poorly

trained men the group sometimes assumes very large proportions indeed, and becomes quite useless as an offensive factor in war.

The width of a central strip containing 50 per cent of all the hits of any shot group is called the "mean or 50 per cent dispersion." This may be vertical, lateral, or longitudinal.

When a group of marksmen fire either simultaneously or "at will" with the same point of aim and the same elevation, the bullets will form a shot group having the general shape of an ellipse, with its major axis vertical, and will be symmetrically grouped about the center of impact—not necessarily about the point of aim. They will be grouped more densely near the center of impact than at the edges and one-half of all the shots will be found in a strip about one-fourth of the size of the whole group. (Fig. 9.)

If the whole group is found to be, say, 40 inches high, then a strip about 10 inches wide, placed so that about 5 inches lie on each side of the center of impact, will contain 50 per cent of all hits. (Fig. 10.)

When considering the horizontal shot group, the mean lateral dispersion retains its same significance, but what on the vertical target is called the mean vertical dispersion is known here as the mean longitudinal dispersion and is measured in the direction of the line of fire. As in the whole group, the mean vertical dispersion and the mean longitudinal dispersion are mutually controvertible.

With a shot group of fixed dimensions, it is evident that when the target is made sufficiently large every bullet fired will hit the target. (Fig. 11.)

It is also evident that with a very small target, only a portion of the bullets will hit the target, the others missing high, low, and to either side. (Fig. 12.)

When the target is of great width and is as high as the mean vertical dispersion, one-half of all bullets will hit it, the others missing high or low, provided that the center of impact is at the center of the target. (Fig. 13.)

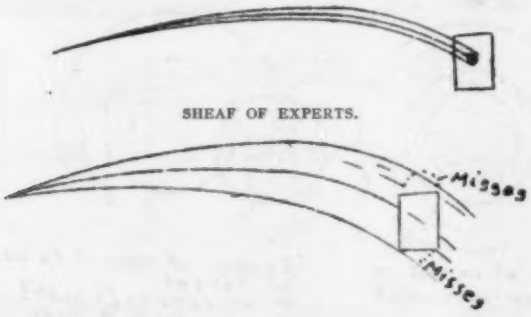


FIG. 7.

All inquiry into the effect of fire is based upon a thorough understanding of the cone of dispersion of fire. For any conclusion reached as to the influence of this or that modifying factor on the efficacy of fire must be based either upon a long and carefully prepared series of experimental firings or upon the theory of probabilities as applicable to known dispersions. Theoretical results have been amply verified by actual firing, and the student may be assured that in studying the theory of fire he

has not made the mistake of departing from things which are real and practical.

It is not necessary to explain the mathematical principles involved in these computations; it is sufficient for present purposes to know that probable effects can be foretold and that by foretelling the results in two contrasting cases, the value of any given influence on shooting can be ascertained.

In order that comparisons in shooting may be made, in order that the influence of an incorrect elevation may be demonstrated, and for other and analogous reasons, the whole subject of war shooting is based upon an understanding of dispersions, misplaced centers of impact, densities, and such fundamental principles. The merest tyro knows that it is harder to hit a small object than a large one, harder to hit an object at long range than at short, harder to make a high percentage on the range with the distance estimated than when the distance to the target is known; but this is insufficient. One must know how to foretell a result under perfect conditions, then from this to measure the degree of importance to be attached to every deviation from these perfect conditions.

Tables of fire have been constructed from which it is possible to calculate the number of hits expected on a target of given dimensions with a certain class of marksmen at any given range. These tables are ordinarily used as standards of comparisons for judging results in field firings and are discussed in the pamphlet on combat firing.

EXPERTS CENTER OF IMPACT MISPLACED.

"POOR" CENTER OF IMPACT MISPLACED.

FIG. 8.

LESSON III

Distribution in Depth and Width

The first step in estimating fire effect is a consideration of the probable per cent of hits on a target wall and the second step goes beyond this and estimates the number of hits to be expected on the figures of a battle target. Such

a measure of comparison of fire effect serves very well for the technical discussion of fire, but we cannot measure tactical results in this way.

A large number of hits may be so concentrated on the target that, while the percentage of hits is large, the number

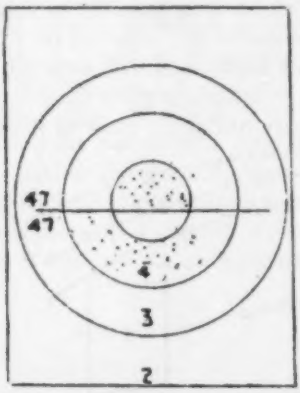


FIG. 9.—ACTUAL GROUPING—SHOTS FIRED AT 150 YARDS, 50 PER CENT HITS ABOVE LINE, 50 PER CENT BELOW.

of figures hit is small, and many of the figures will not be hit at all, consequently the battle efficiency of the fire will be small.

It must be remembered that it is not the number of hits or per cent of hits, but the number of men disabled that brings results in war. Only by disabling enemy men can a commander, as a rule, expect to gain fire superiority.

The English Field Service Regulations (p. 135) say in part: "The object of a commander who seeks to gain the initiative in battle is to develop superiority of fire as a preparation for the delivery of a decisive blow."

In other words, to force the enemy to play to his lead, a commander must develop and maintain over the whole of the enemy's line such a rate of effective fire as will cause the enemy's fire to become wild and uncontrolled.

The distribution of fire over the entire target is of special importance. (245 IDR.)

All parts of the target are equally important. Care must be exercised that the men do not slight its less visible parts. A section of the target not covered by fire represents a number of the enemy permitted to fire coolly and effectively. (246 IDR.)

Manifestly, then, if the attacker is to hold over the hostile line such superiority of fire that will permit of his advancing to a point from which the bayonet charge can be made, he must subdivide the enemy's line among his organizations as to insure that the whole line will be covered with fire.

It can be readily seen that if the enemy holds the line A–B (Fig. 14), and that the attackers' force only keeps A–C and D–E covered with fire that C–D and E–B will have target shooting. It is true that the portions of the line

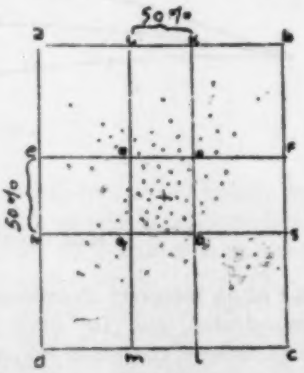


FIG. 10.

covered will be smothered with fire, but one may be assured that sections C–D and E–B will soon discover that they are not suffering any losses, and that there is no fire coming their way. Instead of decreasing their morale it will be increased and they will have a

decided advantage over the men who are attacking.

General Morrison says:

A line of men firing with the rifle, if not disturbed or endangered by the fire of an enemy, can do approximately target practice work. Now let a heavy fire be opened on them, one that is fairly accurate and well placed, and their work falls off rapidly; the heavier the fire they are subjected to the less effective becomes their own fire.

Careful study and research by competent men of foreign armies leads to the conclusion that this line, when not under fire, could make 280 hits in a given time; subjected to a heavy, well placed fire its effectiveness would fall to $^1/_{40}$ or $^1/_{70}$; that is, from 280 hits to 7 or 4.

With our present infantry arm an advance against a hostile line doing 280 work is impossible. Bring the enemy's effectiveness down to four and keep it there and you can advance and win.

Referring again to our problem above, ½ of the enemy's line is only making at the rate of 4 hits per minute, but the half that is doing target shooting is making 140 hits. Advance is impossible.

The fire being equally distributed over the whole target, the greatest possible number of figures will be hit (the percentage of hits to shots fired will, of course, remain the same), but even when the fire is equally distributed, many targets will be hit more than once, and some will not be hit at all, unless the number of hits is very small in proportion to the number of figures. That is, in an equally distributed fire, the number of disabled figures depends upon the ratio of the number of hits to the number of figures contained in the target. For example: let us suppose that the target is composed of 100 figures, and at each series of shots 5 per cent of the figures are hit. After the first series there will be five figures hit and 95 that have not been touched. With the second series, 5 figures are again hit, but as the number of unhit figures was 95, it is evident that the possibility of hitting 5 new figures is diminished.

Mathematically, only 4.75 unhit figures would be struck on the second firing, while 0.25 figures would be hit a second time. There would remain, as a result, 90.25 unhit figures.

At the third firing 4.5 new figures would be hit for the first time and 85.75 figures would not have been hit at all.

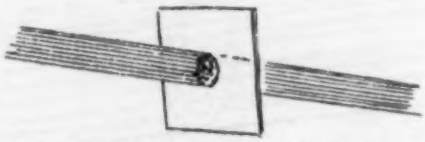


FIG. 11.—SMALL SHEAF—LARGE TARGET.

Without entering into the demonstration further, it is sufficient to say that a table may be constructed which will show how many hits must on the average be obtained in each figure in order that a certain percentage of all the figures in the target may be hit at least once; and what per cent of figures hit may be expected when every one is hit a given number of times. (See Rifle in War, page 88.)

The table presumes that the probability of being hit is the same for all the figures, that is, that the fire is equally distributed over the whole target, and that all of the figures present equally vulnerable areas. These conditions will of course never be met in the service

firing of infantry, for infantry fire will never be as equally distributed as the theoretical "equal distribution," nor even as evenly distributed as artillery fire, nor will all of the targets be equally exposed, because of folds in the ground, and other features which will make one part of the target less vulnerable than another. The effect of this will be to reduce the expected number of hits as determined by the table, though artillery often approaches it very closely.

Too much emphasis cannot be laid upon the necessity for fire distribution because with officers and men trained as well as is possible in times of peace, in time of war the distribution will not nearly approach that of peace time firing, bad as that ordinarily is.

So far distribution in width alone has been considered, but it must be remembered that there is another form of distribution, that is depth.

If a company of say 100 men fire with a common sight setting and the same aiming point the longitudinal shot group of the combined firing would be elliptical in shape and the greatest number of hits would be in the center of the group with a gradual falling off toward either flank of the target. Now the correct shape or the shape to be desired in the shot group would be a parallelogram which enclosed the entire target. This would reduce the distribution in depth a little, but not so much that it would have any appreciable effect and would insure the maximum number of hits on the *maximum number of figures* of the target.

A knowledge of the depth of the 50 per cent longitudinal zone is necessary to a proper understanding of distribution in depth, and for average shots this is for the 700, 800, 900 and 1,000 yard range 156.66, 135.28, 118.57 and 105.89 yards respectively.

For good shots the dispersion is less and for poor ones greater.

It is noted that as the range increases this depth decreases.

It is decreased by a slope that is rising with reference to the line of sight and increased by one that is falling.

FIG. 12.—LARGE SHEAF—SMALL TARGET.

This particular phase is taken up later.

By the use of combined sights the depth is increased to offset the effect of incorrect estimates of the range. (Page 22.)

INFLUENCE OF THE RATE OF FIRE

The greater the losses inflicted within a short period of time in a limited space the greater the moral effect of the fire.

There is a direct relation existing between the number of bullets which fall in a given area and the resulting hits on a target placed in that area.

The regulations prescribing the standard for field firing say in discussing the time element in the solution of fire problems:

"There remains the question of actual time required to execute the fire,

since it is not absolutely the number of hits made but it is the number of hits made in a unit of time which must be the basis of judgment." Von Rohne states: "In field firing it is less a matter of obtaining large percentages of hits than of an absolute large number of hits in a unit of time." There is necessarily a limit of rapidity of fire which if exceeded will result in some loss of accuracy. This rate of effective fire depends upon a number of factors:

1. It will be faster for trained than for untrained troops.

2. A company on a peace footing will have a greater rapidity of effective fire than one on a war footing.

3. It will be faster at a large than at a small target.

4. It will be faster at a target which stands out in bold relief than at one which is vague in outline and whose color blends with a neutral background.

5. The physical condition and the morale of untrained troops have a marked influence on the rapidity of effective fire.

6. The aiming position also has its effect—one can fire faster from an easy position than from a cramped one.

7. It will be faster at short than at long range.

8. It will be faster at the beginning of an action than after firing has continued for some time.

There is some variety of opinion as to the rates of fire which are consistent with accuracy, and it is obvious that in proposing a standard of performance no more can be done than to present an approximation to which there must be some exceptions. The standard rates of fire proposed below are based upon experience and observation at the Musketry School (Monterey). When firing a single clip the rate is obviously faster than when two or more clips are fired.

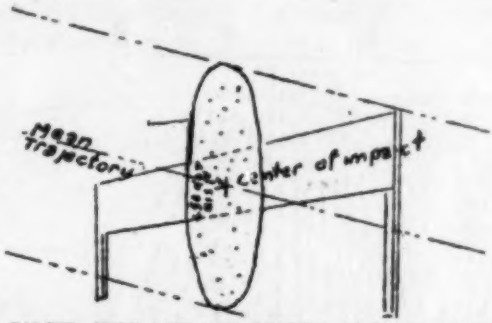


FIG. 13.—WALL TARGET, VERY LOW AND EXACTLY AS HIGH AS THE MEAN VERTICAL DISPERSION—CENTER OF IMPACT IN CENTER OF TARGET.

	Range	
10 per minute:	200	
	300	yards
	400	
7.5 per minute:	500	
	600	yards
	700	
5 per minute:	800	
	900	yards
	1000	

(At greater ranges 3 per minute, 209 S. A. F. M.)

This rate includes the time required for recharging the magazine which is taken to be 10 seconds. Should the rate

of fire at any range fall very much below the rate given it may be said that a proper use has not been made of the time element and should the rate be very much in excess of the standard given it may be concluded that there has been some loss of accuracy. The rates given should not include higher rates of fire in the case of large and very conspicuous targets, such as dense skirmish lines, bodies of cavalry or batteries of artillery. In no case at ordinary targets, even at the longest range given above, should the rate of fire fall below 5 shots per minute.

same targets. In first case 44 hits were made and in second case 23 hits.

From this it is apparent that there is a correct rate of fire for the different ranges and for different degrees of training of the men. Manifestly if two forces are firing against each other, one maintains, say, a fire of 10 shots per man per minute and gets the proportional number of hits as shown above and the other fires at the rate of 5 shots per man per minute, getting the hits shown, the first will have fire superiority and the second is whipped.

It is to be remembered that rapid

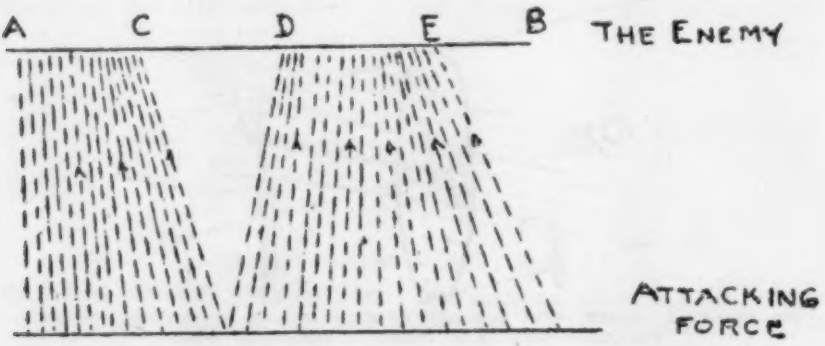


FIG. 14.

A lower rate, it has been found, cannot improve the accuracy of the rifle in detachment firing, and on the other hand the rate of ten shots per minute cannot be exceeded by the average soldier without a loss in accuracy. A high rate of fire may easily degenerate into unaimed fire.

In a demonstration at Fort Sill, Oklahoma, a squad of 8 men fired 20 shots per man in 2 minutes, or at the rate of 10 shots per minute at a range of 500 yards, against a line of eight kneeling figures. The same squad then fired 10 shots per man at the rate of 5 shots per minute at the same range and the

firing is primarily rapid manipulation of the pieces, *i.e.*, the mechanical part of it.

The rate of fire is dependent to a great extent upon the size and visibility of the target. The larger the target and the more plainly it stands out the quicker and easier can the soldier catch his aim. On the other hand, if the target is small and indistinct it will take more time to find the aiming point after each discharge of the rifle.

Short bursts of rapid fire, especially if they are in the nature of surprise fire, should and will exert a tremendous power towards the breaking down of the defender's will.

There are two forms of rapid fire. That which might be called the ordinary rate as given in the Standard for Field Firing and quoted above and then a very high rate of fire maintained for a few minutes, which the English call the mad minute. The latter will be used against favorable targets which will arise during the fight and which will demand a veritable whirlwind of fire (such as repulsing a cavalry charge, the moment before charging, etc.). This kind of fire can, however, be kept up for only a short time, not exceeding 2 to 4 minutes, on account of the enormous expenditure of ammunition, the fatigue of the men and the excitement which a prolonged and continuous rapid fire produces on the men (the physiological effect).

Colonel Von Scherf says:

The physiological influence of a rapid fire on the nervous system of the combatants is such that at the end of a very short time, which cannot reasonably last more than five minutes, the troops on the offensive will either dash forward or retire.

The expenditure of ammunition during these minutes of extreme rapid fire will be enormous, but such targets and such opportunities to inflict a heavy loss upon the enemy fully justify the expenditure.

The rate of fire attained in these bursts without loss of effect depends directly upon the peace training of the troops; with men properly trained it may be as high as 15 to 20 shots a minute—the English claim more.

With untrained troops it is of course the height of folly to ever expect them to reach this standard; their dispersion would increase to such dimensions as to be of absolutely no value.

In addition to the influence on the rapidity of fire of the peace training of troops will be the range at which the firing is done, for the distance not only makes more time necessary in aiming, but as the distance increases the position of the firer becomes more and more strained, the target more difficult to see and to hit and the calmer mental state of the firer induces refinements in sighting that would be impossible at the short ranges where the impending crisis would urge him to his maximum speed. This is not true of untrained troops—they should not even be considered as anything but a minus quantity in modern war—who will through lack of fire discipline fire all their ammunition away at the first firing position.

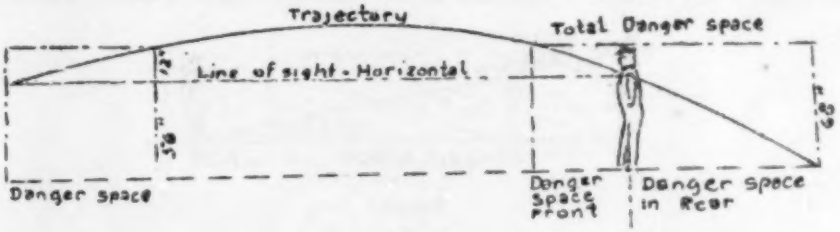


FIG. 15.

LESSON IV

Danger Space

Danger space is defined by the Small Arms Firing Manual as being the sum of the distances in the path of the bullet in which an object of given height will be struck.

If a man standing fire a rifle with a horizontal line of sight, it is evident that for a certain distance in front of the muzzle another man may be hit by the bullet while in the rising branch of the trajectory. If we assume that the muzzle is at a height of 56 inches from the ground, and that the average height of a man standing is 68 inches, then it will be dangerous for a man to stand anywhere in the line of fire between the muzzle and the point where the bullet, in its upward flight, rises above the head of the man (68 inches).

Since the line of sight is 56 inches above the ground, the trajectory will be 68 inches above the ground when it has risen 12 inches above the line of sight, or when it has attained an ordinate of 12 inches. If the firer is using a great angle of elevation, the trajectory will attain an ordinate of 12 inches in a rather short distance; if, on the other hand, the angle of sight be small, the bullet will travel so nearly horizontal that it will not attain the 12 inches in a very great distance if at all.

Whatever this distance is, in front of the muzzle, within which the bullet does not rise higher than the object, it is called the danger space of the rising branch of the trajectory. If the firer is shooting from a prone position, so that the muzzle, instead of being 56 inches from the ground, is only 12 inches, then the space would be dangerous for a standing man from the muzzle to a point where the ordinate of the trajectory is (68"–12") 56" high and the danger space in this case would be about 5 times as great as in the case of the standing firer. So also is the extent of the space dependent upon the angle which the line of sight makes with the horizontal, as where the firing is done up or down hill, where a prone man aims at the head of a mounted man, etc.

The danger space for a mounted man is obviously greater than for a man lying down, and so in each case it is necessary to know all the conditions before the table of danger spaces, as published by the Ordnance Department, can be of any value.

In the falling branch of the trajectory is another danger space analogous to that just discussed, and, like that, dependent upon certain conditions of firer, line of sight and object for which the space is dangerous.

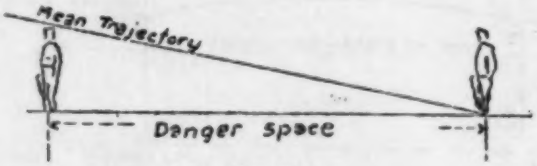


FIG. 16

If the point of aim is taken at the head of a standing man (A, Fig. 16) all the danger space will lie in rear of the target, if on the other hand aim be taken at the foot of the target (B, Fig. 16), the entire danger space will lie in front of the target.

This is one of the principal reasons why soldiers are taught to aim at the foot of the target.

If, as in the case usually assumed, the point of aim is at the middle of the object fired at, part of the danger space will lie in front of the target and part in rear.

It is evident that the extent of the danger space depends upon the relation between the trajectory and the line of sight-angle of fall—and therefore on the range and the curvature of the trapectory, on the height of the target and finally on the point of aim; that is, the point where the line of sight meets the target. (Fig. 17.)

If we consider a target with a height (h) placed in the line of fire, then the danger space beyond the target extends through the point of impact (middle point of the target) to A, where the trajectory has fallen one-half the height of the target below the line of sight. In front of the target it extends to a point B′ where the trajectory has risen one-half the height of the target above the line of sight. The continuous danger space therefore extends from the point B′ (high strike) to A (ground strike), and it is evident that the location of the high strike and the ground strike determine extent of danger space.

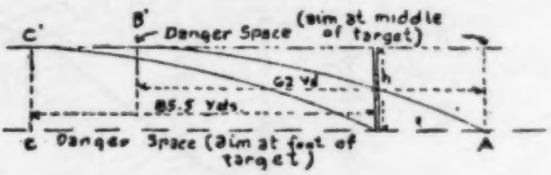


FIG. 17.

By using an elevation of 700 yards against the middle point of a cavalryman, 8 feet high, the danger space extends from the firer to 801.5 yards. Against an infantryman, on the other hand, it extends from the 586.8-yard point (high strike) to 772.6 yards (ground strike) or a total distance of 185.8 yards.

If the point of aim is taken at the *bottom* of the target in the foregoing cases, it is 700 yards long in each case; a noticeable gain in the latter case, but a loss in the case of the cavalryman.

The term "danger space" is not to be confused with the term "beaten zone," which means the intersection of the cone of dispersion, or sheaf, with the surface on which the objective of the fire stands or the space on the ground in which the bullets strike, in a series of shots fired by a body of soldiers with the same aiming point and the same rear sight setting.

Danger space is a theoretical distance.

Swept space is the danger space as modified by the ground slopes.

In dealing with danger spaces, it is usual to distinguish between the *danger space* and the *swept space*, both of which are functions of the mean trajectory and between these and the dangerous zone which is a function of the whole, or a part of the cone of fire.

It will be observed that for a given height of target and point of aim, the danger space is of fixed dimensions at the several ranges, while the swept space varies in addition with the slope of the ground, being shorter on rising ground and longer on falling ground than the danger space, and all the functions of the dangerous zone, such as the density of the group at given distances from the center of impact, etc., are correspondingly modified.

The fire controller must remember that the danger space under 700 yards is affected by the position of the firer (height of muzzle from the ground), the danger space increasing as the

height of the muzzle decreases; at the longer ranges no material effect is felt from the different positions of the firer due to the increased angle of fall.

Note—For a more thorough discussion of this subject see Eames Rifle in War, pages 94–98.

The Ordnance Department publishes a table of danger spaces calculated under the assumption that the gun when fired is 12 inches above the ground, that the height of a man is 68 inches, that the head of a man on horseback is 8 feet above the ground, and that the point of aim is at the center of the target.

LESSON V

Effect of Slopes and Sites

The influence of the ground on fire effect is manifested by a modification of the depth beaten and grazed by the cone of collective fire. This depth, as has already been mentioned, decreases if the surface of reception rises, or on the other hand, is increased if the surface of reception falls with respect to the line of sight. Diagrammatically this may be shown as in Fig. 19.

There are three general cases to be considered:

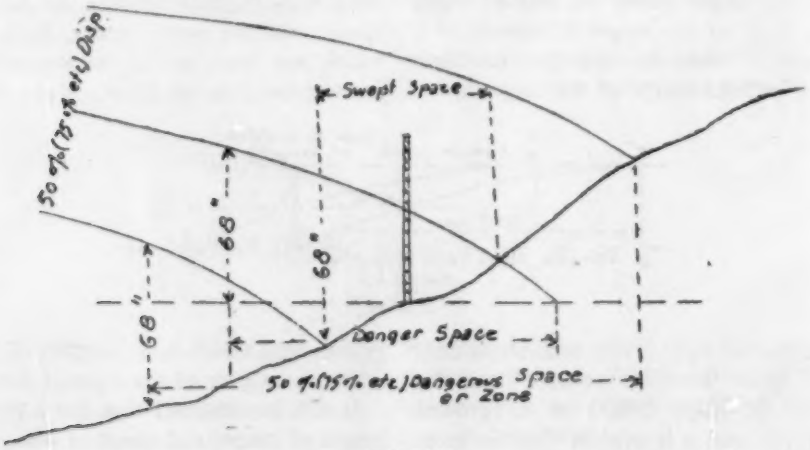


FIG. 18.

Under these conditions the total dangerous spaces for infantry and cavalry at the various ranges are given as follows by the Ordnance Department:

Range.	*Infantry.*	*Cavalry.*
100	680.9	468.3
200	547.3	666.5
300	540.4	676.8
400	572.9	633.7
500	628.3	670.5
600	696.7	731.9
700	420.8	801.5
800	301.8	473.8
900	233.7	352.6
1000	187.2	275.3

First—When the ground rises with respect to the line of sight.

Second—When the ground is level.

Third—When the slope is falling with reference to the line of sight.

Taking Case 1 above the sheaf covers a space of one inch on the slope B–C. In Case 2 the same sheaf on level ground covers 1¾ inches, while in Case 3 it covers 2¾ inches.

The same thing happens on the ground with the sheaf of bullets. No man is expected to work out on the ground the formulæ for reduction of dispersions to different slopes, but if one

remembers that the longitudinal dispersion for average marksmen is about 100 yards at 1,000 yards on level ground, he can appreciate at once that above 1,000 yards the beaten zone will be less than 100 yards and below that more. Hence he can make a rough estimate of the depth of the zone that he will cover on different ground at the different ranges and on different slopes.

When the slope rises with respect to the line of sight, the swept space is less than the danger, and *vice versa*. The greater the rising slope the more will the danger space be lessened. To fire down upon a rising slope gives a less swept space than to fire from below upon a rising slope.

If we consider reverse slopes it will be seen that the fire effect is as much

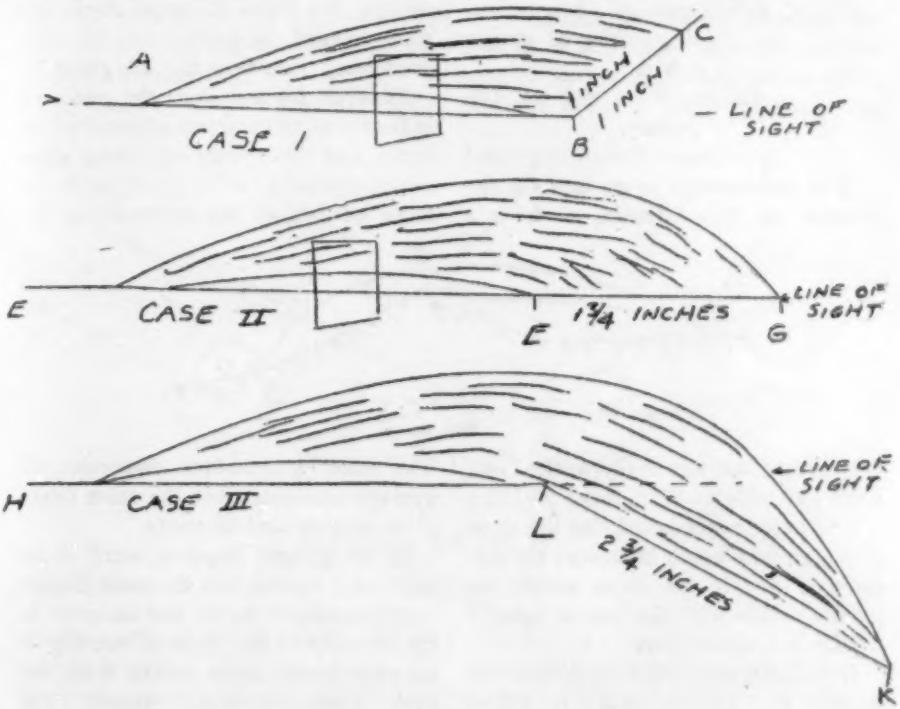


FIG. 19.

Everything else being equal, it is well to note that these modifications in the depth of the beaten zone do not affect the efficacy of adjusted fire on a single line. In other words, a line is as vulnerable on rising and falling ground as on level, provided all the other conditions affecting fire are equal. *The reader must bear in mind that this is not true of targets having depth.*

modified by them as it is by forward slopes. For instance, in the diagram (Fig. 20) fire from E against the rising slope AB would produce a swept space ABC if the ground did not change slope at B. However, the swept space is modified by the falling slope to ABD, of which BD is due to grazing fire.

The simple equation by means of which the effect upon the longitudinal or

horizontal depth may be calculated, knowing the longitudinal horizontal is

for the rising ground, $S = d \frac{f}{f+g}$,

and for falling ground, $S = D \frac{f}{f-g}$.

Where g is greater than f there is a dead space.

In which S = Dispersion as influenced by the slope.

d = Depth of longitudinal dispersion, or danger space.

f = Angle of fall of trajectory.

g = Angle of slope of ground

It is unnecessary to go into the derivation of this formula, as it is a very simple one and easily worked out. (See The Rifle in War, pages 99-101.)

It is to be remembered that the slope of the ground which influences the efficacy of fire is the slope which the ground makes with the line of sight.

Take a concrete case.

I. At 1,000 yards the longitudinal dispersion for average shots is 105.89 yards. The angle of fall is 1° 29′. The ground slopes upward at an angle of 1° with reference to the line of sight.

Hence $S = 105.89 \times (1.5 / 1.5 + 1) = 63$ yards.

II. Taking the same problem for a falling slope and the problem becomes:

$S = 105.89 \times (1.5 / 1.5 - 1) = 318$ yards.

In Case I, suppose that 1,000 bullets on level ground were falling in the space of 105 yards, as soon as the dispersion is applied to a rising slope of 1° there are 1,000 bullets falling in an area only 63 yards long, front to rear. In the second case they are scattering over 318 yards.

The remedy to be applied in the first case is combined sights whereby we increase the depth of the beaten zone.

Applying the first case to local conditions, the Class A range slopes upward toward the butts from the 600-yard firing point at an angle of about 1°.

Consider for a moment the combined influence of an incorrect estimate of the range and an upward or rising slope of the ground of 1° at 1,140 yards the angle of fall of the trajectory is 2°.

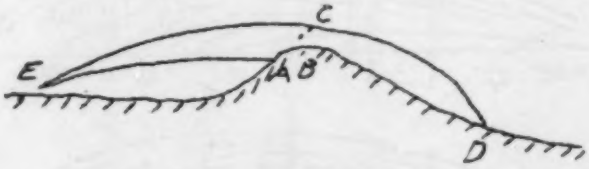


FIG. 20.

The mean longitudinal dispersion of average marksmen for the same range is on level ground 68 yards.

If the ground slopes upward at an angle of 1 degree, then the mean dispersion becomes 45 yards, and an error in the estimate of the range of one-eighth becomes much more potent than the same error on level ground. At this range and on level ground an error of one-eighth of the range (= 142 yards) will reduce 100 expected hits on the target at the correct range (1,140) to two hits at 1,282 yards. If the ground slopes upward one degree, as in the example, no hits at all would result. If the ground slopes downward one degree, the mean dispersion is doubled, and at 1,282 yards the target would receive 47 hits.

As these figures are based on the influence of a slope hardly perceptible to the eye—and certainly unappreciable when the line of sight is not horizontal—it should be evident that the slope of the ground is of immense importance in the efficacy of infantry fire.

Taking a third case: Assuming that the ground slopes downward 4° and other conditions as in the first case. Then $f = 1° 29'$ and $g = 4$. Therefore, $S = 105.89 \times (1.5 / 1.5 - 4) =$ a minus quantity, and in other words a dead space exists.

The fourth case: When the angles of slope and of fall are equal, the result is infinity. This means that the dispersion would become infinite were it not for the curvature of the trajectory. It is at once seen from the above deductions how important is the subject of slopes on the efficacy of fire.

Without a study of the subject one would naturally conclude that reverse slopes are safe because out of sight, and that the formation to adopt behind crests is the line of skirmishers. It is unnecessary to remark that these false ideas have cost many lives in battle. From the above formula in conjunction with density and fire tables, the expectations on targets placed along falling and rising slopes can now be calculated.

As an illustration of effective fire against a line of targets placed on the reverse slope of a hill may be mentioned a fire problem conducted here in which the targets were invisible to the firers and the firers in the prone position, the one from which the firing was done, were invisible to the target.

A skirmish line of 127 kneeling figures on a 1° reverse slope 50 yards in rear of the aiming point, on the crest, received 251 hits on 97 figures. Out of a total of 2,429 shots fired by a company of 122 men at a range of 900 yards again in the same problem, 116 figures out of the 127 were hit.

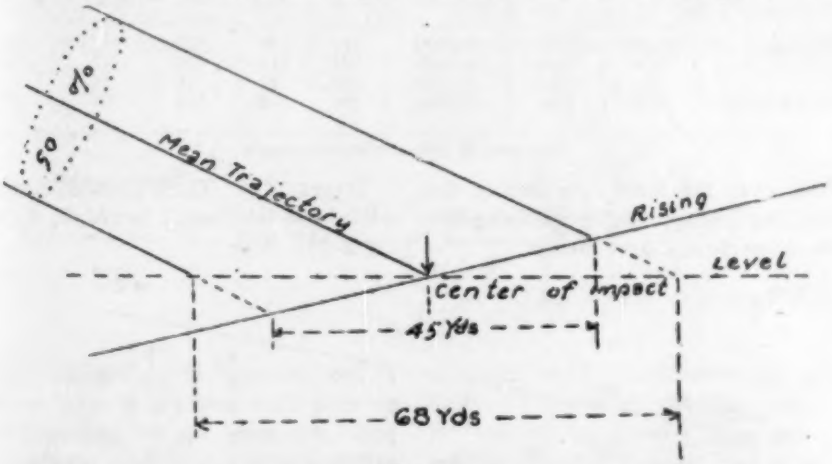


FIG. 21.

Suppose targets be placed on the crest line "A," and similar ones every 50 yards in rear up to 350 yards. The diagram (Fig. 22) illustrates the percentage of hits, counting those at A as 100 on a 1° falling and a 2° rising slope. The range is 1,000 yards.

The French School of Fire worked out practically this problem, using two experiments. In the first, visible targets were placed along a crest and four

lines of invisible ones in rear at 100, 200, 300, and 400 meters. Fifty soldiers fired 200 rounds each, 10,000 altogether, at 3 ranges, 1,150, 950 and 750 meters.

In the second experiment the visible screen was moved at 150 m. in front of the crest. The 50 soldiers fired 10,000 shots at it from the 950 m. firing point.

The Table of Results gives some startling results.

TABLE OF RESULTS

	Distance	Elevation	No. of shots	Hits—Lines				
				1st	2nd	3rd	4th	Total
First firing.....	1150	1150	10,000	542	400	179	114	1255
	950	9g0	10,000	783	717	615	471	2586
	750	800	10,000	19	11	20	35	175
Second firing...	800	800	10,000	196	120	101	72	489

The crest in this case forms a mask.

Note from the third case that as the attacking line approaches the firing line the supports can draw nearer.

Target. (1) Three board targets (Wall) 48 feet long, 2 feet high; placed on a 3½ slope.

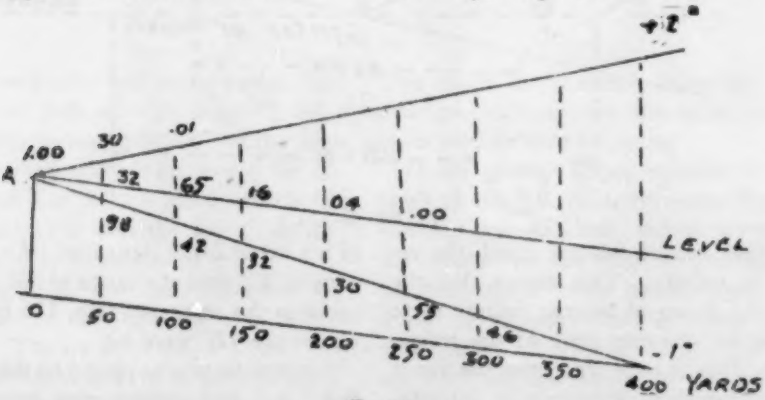


FIG. 22

The following demonstration was carried out during the special course for noncommissioned officers, 1915, here and shows in a very graphic manner the difference in firing against a slight rising slope and on levelground. (Fig. 23.)

Object. To illustrate the influence of ground rising with respect to the line of sight on the beaten zone and the scope of a single sight setting when the ground is favorable.

Method. (1) Platoon of 24 men fired a series of 10 shots per man with a sight setting of 580 yards and aiming at Target A.

(2) Same sight setting and aiming at Target A, firing same number of rounds as in first case.

Results:

First case—Rising slope—
63 hits, Target A
11 hits, Target B
None, Target C

Target (2) same target (Fig. 23) placed as shown in Fig. 24 on level.

Results:

Second case—level ground—
57 hits, Target A
60 hits, Target B
13 hits, Target C

From the above discussion, certain well defined conclusions may be drawn with reference to the utilization of ground slopes.

On ground rising with respect to the line of sight the supports and reserves can be placed closer to the firing line than on level ground so far as danger from *fire directed on the first line is concerned.* The steeper the slope the closer in they may be.

They ricochet most frequently on water, on rocky and hard ground, more rarely on wet meadows and on tilled soil, but they do not ricochet at all on sandy soil. Ploughed fields in which the furrows run obliquely to the line of fire eliminate ricochets.

The number of ricochets depend on many elements, such as the character of the surface of strike, its slope and the mass and shape of the bullet as well as the range and the accuracy of the fire. At long ranges the angle of fall becomes great enough to reduce the number.

Where the angle of fall is such that the bullet strikes the ground point on,

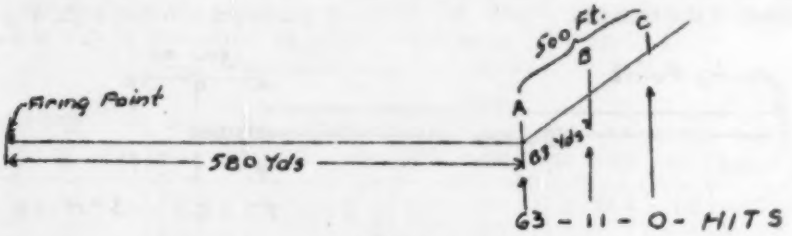


FIG. 23.

On falling slopes the supports and reserves must be further back than on level ground except when the slope exceeds the angle of fall enough to give a defiladed space close to the firing line.

A knowledge of angles of fall, of slopes and of their relation to each other is of great importance to leaders of fighting men. The ostrich-like tendency to think the supports secure from fire because the enemy cannot see them must be overcome.

No discussion of the subject of the influences of slopes would be complete without a discussion of ricochets.

Due to the elongated form of the modern bullet, it tends to tumble on striking even slight objects. Balck says: it buries itself or rebounds and falls dead. If the range is underestimated the number of effective ricochets increases. The opposite is true in over estimates. Untrained men, many of whose shots strike close to the firing point, increase the number of ricochets beyond the average which is generally accepted as about 16 per cent.

Usually a small arm projectile is deflected on ricocheting to the right of the plane of fire, apparently due to the twist of the bullet in flight. Sometimes due to favorable irregularities of the ground, this deflection may amount to 30° when the limit of the range will not exceed 1,500 yards. The range of the ricochet may be as great as 2,500 yards. Certain experiments in France,

when firing at 800 m. gave 4 per cent of the ricochets on targets the height of a man at 1,400 m. and 1 per cent on similar targets placed at 1,850 m.

During field firing at Fort Wm. McKinley, in one of the problems, 23 per cent of the hits were ricochets.

The effect of ricochets is such that in the occupation of a defensive position due consideration should be given to the nature of the ground immediately in front of the line of trenches, with a view to eliminating as much as possible the effect of ricochets, thus adding to the essentials of an ideal defensive position, which is never found, another item to be included in the final compromise location of the trenches.

of impact is easily demonstrated by reference to a table of ordinates. Examining an extreme case, let us suppose that the range is actually 500 yards, but is estimated at 1,000 yards, the firing being over a level plain.

The line of sight is horizontal and is not changed by an incorrect estimate of the range. With a correct elevation, the trajectory rises to its summit and then falls, meeting the line of sight at the target where the point of aim and center of impact should coincide. With sights set at 1,000 yards, the trajectory is still rising at a range of 500 yards and is 14 feet above the line of sight and point of aim. (Fig. 25.)

If the target is 6 feet high, and the

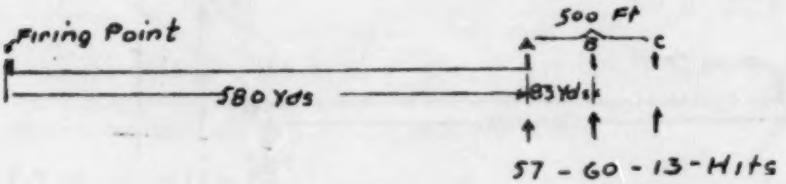


FIG. 24.

LESSON VI

THE INFLUENCE OF AN ERROR IN THE ESTIMATION OF THE RANGE

Any error in the determination of the range to the target plays a most important part in the efficacy of the fire, as it forms the basis at least of the sight setting used.

When it is remembered that the placing of the center of impact is not a question of aiming but the result of an ordered angle of sight (range), and that in war, ranges are estimated—and usually very poorly—it will be seen that in the usual case more hits will result from average shooting than from very fine shooting. That marksmanship has nothing to do with location of the center

point of aim is at the center of the target, the mean trajectory will be 14 feet above the top edge of the target. With a cone or sheaf 22 feet in diameter, so that the lowest bullets are 11 feet below the center of the sheaf (mean trajectory) it is evident that these lowest bullets will just graze the top of the target, making no hits at all. And this displacement of the center of impact would be the case without any regard at all to the skill of the firers, the only result of skill in shooting manifesting itself in the size of the cone. With a close-shooting expert squad of marksmen the cone or sheaf would be very small (about 6 feet in diameter), and no hits at all could be expected. With poorer shots (assumed dispersion such

as to produce a cone 23 feet in diameter) a few scattering shots would be expected. The point of aim in each case would be the same and would not influence the result; but the shooting skill of the marksmen would affect the result the reverse of what would be expected by any one unfamiliar with the subject. (Fig. 26.)

It will be observed that two factors here enter into the probability of hitting: (1) the skill of the men; (2) the skill of the officer in estimating distance.

If an officer cannot obtain and announce the elevation with reasonable accuracy to his men, it is self-evident that his organization will attain results in war in inverse proportion to the skill of the men in shooting.

Ranges may be determined by reference to maps, or by the use of mechanical range-finders, by actual measurement or by other relatively accurate means, but by far the most of the ranges in battle will be determined by the guess that we signify by the name of estimates.

Experiments conducted in the 5th Brigade at Galveston, with four regiments of infantry involving hundreds of estimates by trained estimators, confirm previous experiments here and abroad, that the "probable error" in estimating the range to battle targets over unknown ground and at infantry ranges is 12.5 per cent. By using the "probable error" as a basis of discussion, one recognizes that in one-half of all cases the error will be greater than the probable and that in the other half the error will be less than the probable error.

The influence of such an error may be investigated theoretically and the result proved by a practical firing, and this has in fact been done many times, so that in the following theoretical discussion of the subject, the student may feel that the results obtained are not only theoretically correct but practically correct also.

If a series of target screens be placed one behind the other at 25 yards intervals, each screen 3 feet high, and the line of sight at the center of the targets be horizontal, average marksmen, good marksmen and poor marksmen will make the number of hits shown on each of the targets when the sights have been set at 1,000 yards.

Targets	Yards										
	875	900	925	950	975	1000	1025	1050	1075	1100	1125
Good	0.0	1.5	8.2	19.0	33.5	40.0	31.0	15.4	4.8	0.8	0.0
Average	3.1	7.5	12.9	19.6	24.6	26.4	23.2	16.8	10.0	4.7	2.3
Poor	8.9	10.3	11.7	12.5	13.3	13.4	12.6	11.0	9.6	7.3	6.4

From this table it is seen that the target at the correct range—1,000 yards—received the most hits when fired at by the good marksmen and the fewest when fired at by the poor marksmen. Good marksmanship therefore brought its reward in the number of hits made on this target which was at the range for which the sights were set. Examining the end targets which are in error 13.5 per cent, these results are reversed and the poor marksmen made more hits than either of the other classes. The reason for this is evident when we consider the relative size of the sheaf of good and poor marksmen. With good marksmen the small sheaf results in all the shots falling on the ground near the

point for which the sights were set, while with the large sheaf of the poor marksmen, many shots fall short or over the set range and a considerable distance from it.

If each of the shots stopped in a place, a mound of bullets would be formed with its center at the 100 yard target. With good marksmen, this mound would be piled very high and would cover only a small space on the ground. With average shots, the mound would not be so high at the center because fewer bullets would fall at that point, but it would cover more ground because of the greater number falling short or over. This difference is more marked with the poor shots.

If we examine the above table we shall see that the results expected from average marksmen exceeds that expected from good marksmen if an error of 50 yards has been made in estimating the range to a 1,000 yard target, but that if we can determine the range correctly, the good marksmen will attain 50 per cent more hits than the average marksmen Since the purpose of training is to secure the maximum of hits, it is evident that we must train for two things—marksmanship and range determination. That an error in the estimation of the range is important at the shorter ranges as well as at the range chosen, the following table has been prepared showing the effect of a 12.5 per cent error at the ranges under 1,000 yards.

This table shows:

1st. The great advantage of small dispersions (precision in aiming) when the range is exactly known, because if the targets were at the exact ranges taken, the figures in brackets show the results as compared with the unbracketed figures.

2d. That the advantage of small dispersions decreases with the range when the correct elevation is not used, but one differing by only a probable amount from the exact elevation, because we can see from the table that at the shorter ranges the bracketed and unbracketed figures approach more nearly the same values, that is, the expected results at shorter ranges are affected less by error in estimation than at longer ranges.

3d. That the smaller the dispersion the

TABLE VI

With an error of one-eighth of the range, the number of hits obtained from 100 shots against a wall target 36 inches high is:

Range, yards	Error, yards	Number of hits		
		Good	Average	Poor
300	37.5	99.0 (99.4)	94.0 (94.7)	62.0 (66.9)
400	50.0	88.8 (93.3)	70.0 (80.9)	47.0 (49.0)
500	62.5	58.8 (79.5)	49.0 (62.3)	32.4 (34.4)
600	75.0	29.4 (66.9)	33.6 (50.0)	23.9 (26.4)
700	87.5	13.3 (58.5)	21.5 (41.1)	18.0 (21.3)
800	100.0	4.5 (51.3)	12.6 (34.4)	13 6 (17.6)
900	112.5	0.9 (45.2)	6.5 (29.9)	10.2 (15.2)
1000	125.0	0.01 (40.0)	2.4 (26.4)	7.5 (13.4)

NOTE: The numbers in parenthesis show the number of hits with correct elevation, if the target were actually at the range given.

more rapidly does the effect decrease with an inexact elevation, because we see in column "Good" a very small difference at short ranges (99.4); increasing to .01 (40.0). In the column "Poor," at 300 we have 62.0 (66.9), the difference increasing only to 7.5 (13.4).

4th. That up to 500 yards precision is of more importance than the estimate of the range, because beyond 500 yards the results obtained by good marksmen are less than those attained by average marksmen.

5th. That at 700 yards even poor marksmen will get more hits than good marksmen. At 800 yards poor marksmen obtain more hits than either of the other classes. At 900 yards poor marksmen will obtain ten times as many hits as good marksmen.

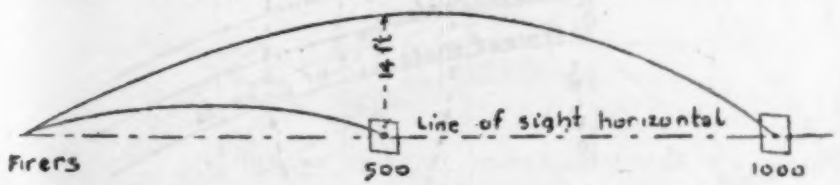


FIG. 25.

From the foregoing it is seen that the influence exerted by an error in the range estimation is very powerful, that it is more powerful as the marksmanship of the firers increases in accuracy, and that it has a correspondingly less effect when the marksmanship is poor. It is further seen that the maximum return for cartridges expended lies not with average marksmen firing with an incorrect range, *but rather with good marksmen when firing with a correct sight setting.*

It is recognized that an error will be present in all estimations of the range and that the small sheaf of expert shots would be fatal to a high percentage of hits under such conditions. Fortunately there are other and compensating factors which enter into battle shooting. *The marksmanship of all firers suffers when the men are under fire,* the small sheaf of the good men becomes more nearly the size that we are considering the dimension of the average shots and these latter enlarge their sheaf to the dimensions of the poor shots whose dispersion is so great under these conditions as to be quite ineffective. Another disturbing factor is that as different rifles are sighted differently, the dispersion of a group will be larger than is here contemplated even when the men are firing as accurately as we have considered.

The essential point of the discussion is that the small error of 12.5 per cent, which is probable in battle, is sufficient to destroy the effect of good marksmanship and to waste the very important advantage that lies with the firers who are well trained in marksmanship unless through superior direction, the leaders are able to make up for the loss of effect due to an error in the range.

We have considered, in the foregoing, a group of men firing with a common sight setting. Suppose that each of these men estimates the range for himself and fires individually with his own choice of elevation. In this case, and assuming that the men can estimate as well as the company range-takers, the error to be expected of each man is

12.5 per cent as before, but since some are shooting with an elevation 12.5 per cent too high and others with the same error but too low, we should have a combined shot group made up of many smaller groups, each of the same size, but arranged each about its own center of impact, and the combined group would therefore be larger than any one of the individual groups. In a word, such a procedure would have the effect of lowering the classification of the marksmen so that the good shots would become average marksmen and the average become poor shots.

Average marksmen, for example, at 800 yards expect 34.4 per cent of hits against a certain target when using a common sight setting. With individual estimates of the range, they would expect but 15 per cent. This loss of effect varies with the range and with the quality of the marksmen, for as stated a small error on the part of good marksmen is fatal when with poor shots the same error is immaterial. This is because the error in placing the center of impact is more important with good shots who make small errors in aiming, than it is with poor shots whose errors in aiming may be so large that it really matters little where they put their center of impact. The range at which, for the different marksmen, an error in the range exceeds in importance an error in aiming, for good shots is 250 yards,

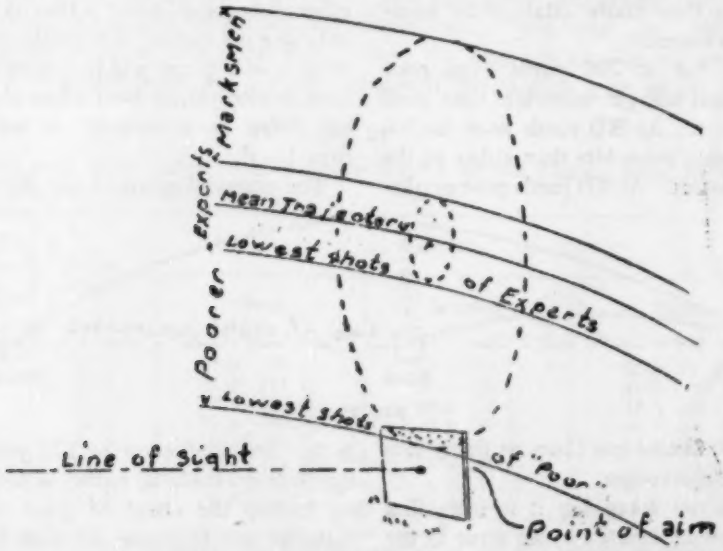


FIG. 26.

for average shots 525 yards and for poor shots 780 yards.

If we have trained a body of men to the grade of good shots, then at all ranges over 250 yards we must provide by training or otherwise that they shall be given the range with an error less than 12.5 per cent. If their training is that of average shots, then we can make errors of 2.5 per cent up to 525 yards, but not beyond. With poor shots we have a still larger limit within which we make this probable error, for until we reach 780 yards, the errors in aim-

ing will be greater than the errors in the range if we hold the latter to 12.5 per cent.

Since most of our effective firing will be done at ranges in the vicinity of 500 yards, and our marksmen will be "good" or "average" at the worst, it follows that we should use every effort to train our estimators to an accuracy of estimate greater than the 87.5 per cent which we have been discussing in this lesson. With our men trained to estimate with an accuracy of even 85 per cent we should expect our training in marksmanship to pay up as soon as we reach ranges under 500 yards, for at 400 yards, for example, "good" marksmen will get more hits even with an incorrect range than will average or poor marksmen who are using the correct range. Hence in battle every effort is made to reach the shorter ranges where the results of the shooting are not materially affected by an error in the estimate of the range, and where the time we have spent in learning to shoot will be justified in the killed and wounded resulting from the fire of our good shots.

To reach these short ranges, however, we have to pass through the longer ranges under a fire which would be prohibitively effective did we not secure fire superiority at the longer ranges and maintain it until the short ranges are reached. Starting in the fight as we hope with good marksmen and knowing that at these longer ranges we cannot expect to get the results with them that we could with average shots or poor shots using the inevitably correct range, the problem becomes one of making average or poor shots of the good marksmen for the time being.

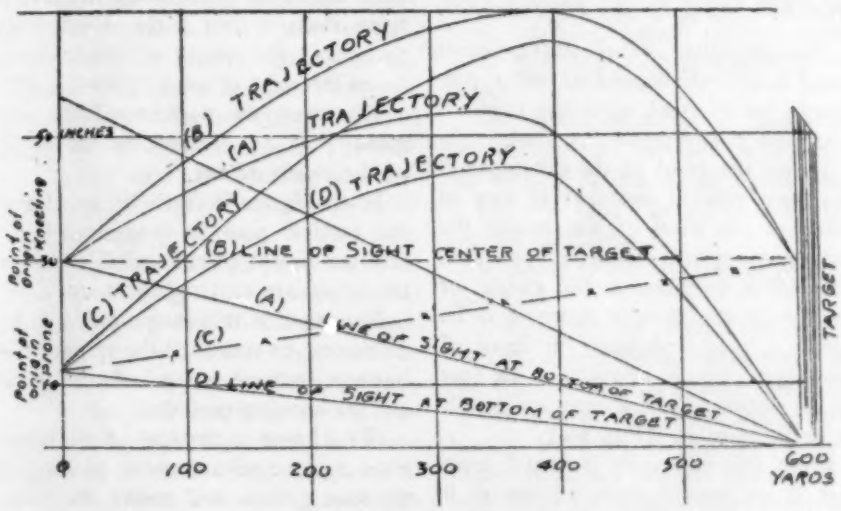


FIG. 27.

At the longer ranges, the beaten zone decreases in depth as the range increases, but as the range increases, the difficulties of range estimation also increase. We have two factors here that are working in opposite directions and we can only hope to make them pull together by altering one or the other. We cannot alter the fact that as the range increases we will get increasingly

large errors in range estimation, but we can alter the other fact that the beaten zone decreases with the range, for we can control our fire and by using more than one elevation cover a zone as deep as we may wish.

In other words by the use of combined sights (considered in Pamphlet V) the effect of an incorrect estimate of the range is partially offset.

LESSON VII

The Influence of the Point of Aim

The effectiveness of the shot group or sheaf is directly dependent, other conditions being equal, upon the point of aim used in any particular firing.

Under the head of danger space it has been pointed out that if aim be taken at the head of the enemy the danger space will lie in rear of him, while if it be taken at the middle of the figure the danger space will lie partly in rear and partly in front of the target. If aim be taken at the foot of the target all the danger space will lie in front of it. (Fig. 16.)

From this statement it would seem that if an enemy were advancing it would be proper to aim at his feet, because he would then literally be walking into the danger space. On the other hand, if the enemy were running away, by the same token the aim should be at his head.

Men in action will not alter their sights at the close ranges, say under 400 yards.

It is also believed to be an accepted fact that in the heat of action men will unconsciously take more front sight than they will in peace practice on the target range.

In a realization of this fact, soldiers of practically all nations are taught to aim at the feet or bottom line of the target for the following reasons:

(1) In aiming at the bottom of an object, the line of sight inclines more and more towards the ground as the enemy gets nearer.

When aim is taken at the middle of the object, this result is not obtained in the kneeling and lying down positions. In fact, the line of sight is horizontal if the firer is kneeling, because the height of origin is the same as the point aimed at, while, when the firer is lying down, it rises as the objective approaches (the height of origin being below the point of aim). (See Fig. 27.)

Moreover, the position of the shot group does not depend on the height of the origin of fire.

In the figure it is to be noted that the vertical scale is exaggerated and that the height of the ordinates of the trajectory are only approximate.

Note that at this range with a point of aim at the center of the target there is some dead space for both the prone and the kneeling positions.

(2) Aiming at the foot of the target gives a more advantageous position to the shot groups and makes the zones grazed by the whole cone longer.

Taking the point of origin as a man standing, 56 inches high, and the target a man standing 66 inches high. Range 600 yards as in Fig. 27. The summit of the trajectory (39 inches) is at a range of 329 yards.

At 329 yards from the point of origin, aiming at the foot of the target, the line of sight is approximately 26 inches above the bottom of the target. The mean vertical dispersion at 329 yards for average marksmen (Eames table) is 19.84 inches, half above and half below the trajectory which is $26 + 39 + 9.9 = 64.9$ inches; therefore, at this

range under the conditions stated the entire space from firer to target would be danger space for the target, standing man, for the entire mean vertical dispersion. Without going into the calculation, it is readily seen by the same process of reasoning that to aim at the center of the target would throw a great part of the mean vertical dispersion at the intermediate ranges over the target.

(3) The ricochets from the lower half of the sheaf are effective.

If the correct elevation is used and the aim is taken at its foot, the object fired at is placed at the point of fall of the mean trajectory, that is, at the center of the beaten surface in advance of the points of impact with the ground of the lower half of the cone. The bulk of ricochet hits are effective and the mean rise of a bullet is said to be twice that of its drop. Hence, if we accept these two statements as correct and refer again to Fig. 27, it is seen at 600 yards the low bullets of the mean vertical dispersion will strike the ground in front of the target, theoretically they would pass 18.2 inches below the target. The greatest majority of these lower bullets of the sheaf will ricochet, under any but the most unfavorable circumstances, and will be effective at ranges considerably beyond the range at which firing is being done.

(4) When aim is taken at the middle of the object, if a shot is fired with a little too much elevation, or if too much of the front sight is used, the bullet may pass above the head of a standing man; this inconvenience is not felt so much when aim is taken at the bottom of the target.

If aim is always taken at the foot of the target the theoretical evil of a less accurate fire resulting from the use of a full front sight is almost entirely avoided.

(5) The front sight which covers about half the height of a man standing when the latter is at a distance of 200 yards is not so likely to hide the object from view.

With small objects such as a trench where only a line of heads is visible if aim be not taken at the bottom edge of the line of heads the front sight is likely to obscure the target in such manner that the soldier will get few hits.

(6) The lower edge of a line of figures, be they only heads or prone figures, furnishes a more distinct aiming point than does the top element of the target.

The distinctness of the target has been commented on with reference to the efficacy of fire under Rapid Fire.

The rule should be to aim at the bottom of the target.

Influence of the size and visibility of the target.

The visibility of target depends upon its size, shape, color, background and the distance from the firer (range).

The size of the target has a direct bearing upon the number of hits to be expected at any range. Manifestly, a very large target at a short range will receive a larger proportion of hits than will a very small target at the same range. As stated under the head of the sheaf there is a direct relation existing between the size of the sheaf and the target.

The larger the target the more readily it can be seen, consequently the soldier can aim with more facility and more accuracy.

The shape of the target affects its visibility. It may be a target with a very large square surface of vulnerable area but be only a few inches high and

of great length, it would not be as readily picked up as would a smaller target but of greater height.

The color of the target is next to be considered. If of a neutral tint which blends with the surrounding colors it may be exceedingly difficult to see it. This subject of backgrounds and colors of uniforms with a view to obscuring the aiming point is a most important subject and one that has engaged the best talent of all armies.

The distance or range manifests itself by reducing the visibility of the target with the increase of the range.

All of the conditions affect the dispersion because if one be firing at a skillfully hidden line of heads, or as will often occur in battle, at no visible target, the ability to aim correctly and to hold on the same spot is rapidly lost and very large angular errors are introduced even when the men are calm and collected as when firing on the target range.

The degree of visibility of the target, then, is one of the most important factors in determining the size of the dispersion and it manifests itself in three ways:

(1) The power to see the target and the existence on the target of a suitable and clearly defined aiming point.

(2) The power of judging distances.

(3) The power quickly and accurately to recognize a target when indicated by an officer or noncommissioned officer.

In all of these the acuteness of vision of the soldier plays an important part and the training of this sense occupies a very prominent place in the soldier's curriculum in all of the leading armies of the world.

City-bred recruits have, as a rule, very poor vision at anything but short distances, but by proper training this defect can be greatly improved and the limit of vision extended to extreme infantry ranges.

If, when firing at the invisible targets which the battle ground of today presents, one cannot see the enemy, manifestly one cannot aim at him. If, however, the eye has been trained to that point of keenness which permits the detection of a skirmish line when partly concealed, a target exists and some result should be expected from the fire. The dispersion of such men will necessarily be smaller than that of men who are firing at an unseen target and without a distinct aiming point. In the usual case the enemy will be absolutely invisible to the majority of the command and recourse must be had to an auxiliary aiming point, some well-marked spot on the battlefield.

The "Void of the Battlefield" will be one of the principal causes of the great dispersions to be anticipated in war, and it is evident that anything which will decrease the influence of such a cause is of the utmost importance. It was a common thing among the English in South Africa with new troops to hear the men say after a battle, "I never saw anyone, I never fired a single round," but at the close of the war these same men had acquired almost as acute a vision as the Boers themselves, and generally were able to see the battle targets.

During the progress of a war is a very poor time to impart instruction in this important part of training in musketry, for the training will be completed only when the necessity for the training no longer exists.

In estimating distances, the range to an object that is clearly visible is much easier than is that to one which is nearly

invisible, the range to the latter being usually over-estimated. If the enemy is quite invisible, recourse must be had in estimating the range to some point on the landscape. If the range is given the men by the leader, the dispersion will not be affected by this factor, but if each man is making and using an individual estimate, then the variety of ranges used will be much greater against a nearly invisible target than against a clearly seen enemy and the resulting dispersion will be correspondingly increased.

Unless the power to quickly recognize an indicated target is well developed, many men of the firing line will fail to pick up the designated objective and will fire either at another object altogether or in the general direction only of the designated target. Having an imperfect conception of just what and where the target is, those with poor vision will fire so erratically, and with such varying points of aim that the dispersion will be greatly dispersed.

Here it is to be noted that those men with exceptional eyesight should be specially trained and that the most use should be made of their young eyes by fire leaders.

The greatest strength of field intrenchments is in their skilled concealment.

INFLUENCE OF TRAINING

The size of the dispersion is variable with the training, physical condition and morale of the soldiers.

Training in marksmanship involves the training of the soldier in aiming, holding and firing on the Class A range, as well as additional training pertaining to field firing.

No one depreciates the training of the soldier in individual marksmanship on the target range as long as it is not carried to such an excess that other forms of training are overlooked.

What is wanted is a well-balanced course that will turn out a soldier who can take his place with the soldiers of the other armies of the world and be their equals if not their superiors.

It must be realized that in the United States it will be impossible to ever go to war with an army of expert riflemen or anything approaching it, the time necessary for such training will not be available. If it were possible to have all expert riflemen it would be an ideal army, because the expert is first of all a man who has disciplined his nerves, he is not as likely to go to pieces as the poorer marksman under hostile fire.

Beyond those ranges at which the battle targets of today will be visible with the naked eye the necessity for individual practice cannot be seen. This range is about 600 yards.

At distances beyond 600 yards targets will ordinarily be visible only with field glasses and auxiliary aiming points will of necessity have to be announced.

From the discussion of the influence of incorrect estimates of the range the rule should be to train men to small dispersions and officers to the control and direction of fire, including the estimation of the range.

Men must be trained to a strict fire discipline, always to aim at the ordered target, with the announced sight setting, and taking the same kind of sight, in no other manner is it possible to keep the dispersion within reasonable limits.

If they are not so trained the army had better stay at home.

It will accomplish nothing but its own defeat.

Prevention of Espionage and Leakage of Information

THE enemy obtains his intelligence through spies, by questioning prisoners, by the examination of documents obtained from prisoners or dead, and by more indirect means, such as letters from soldiers to friends or "marraines," answers to trade circulars, etc. Congratulatory letters or presents are sent to individuals by enemy agents in the hope that military information may be conveyed in the acknowledgment sent by the recipient. Censorship Orders para. 14a must be rigidly adhered to.

2. No officer or soldier will discuss with, or communicate by word of mouth, in writing, or otherwise, to any person whatever, except where it is his duty to do so, any matter referring to the movements, numbers and morale of the troops or their Allies, the intention of their commander, the state of their supplies, or the extent of casualties. He must never mention his unit in connection with the place where it is stationed, nor the formation to which it belongs—such apparently trivial pieces of information may be of the greatest value to the enemy's Intelligence Service.

3. The utmost care must be taken by all ranks in talking either to, or in the presence of strangers. Spies adopt any kind of disguise, not excepting British, French or Belgian uniform, which is in many ways their safest and most effective procedure. By engaging soldiers in what appears to be harmless conversation, they may succeed in extracting valuable indications of important movements of troops. Such information may reach spies indirectly by officers talking of matters of which they have official cognisance in the presence of junior officers or soldiers. Officers must therefore be particularly careful when speaking in the presence of servants, mess-waiters, etc., whose discretion cannot always be relied upon. Spies have been known to obtain employment with units as cooks, mess-waiters, etc., and have thus been able to follow the troops without raising suspicion. Such persons will only be engaged after full inquiry by the Intelligence Branch of the corps concerned. All ranks must be particularly careful when talking either to, or in the presence of, waiters or waitresses in cafés or hotels, barbers, café proprietors, etc., for all such individuals are potential spies. Many prostitutes also are particularly clever spies. Soldiers of the train and supply and ammunition columns must be particularly suspicious of strangers, who will be able to infer the movements of large bodies of troops from information gained as to the respective movements of their supply and ammunition services.

4. The telephone is at all times a most unsafe means of communication, as it is impossible to know by whom such conversations may be overheard. Particularly is this the case in the trenches or elsewhere in the close vicinity of the enemy, for it is certain that the Germans make the most untiring efforts to overhear our messages, and frequently do so with success. The safety of the troops depends on the most rigid ad-

herence to the orders issued regarding the use of telephones.

5. It must be a point of honour with all ranks to be as reticent when they are on leave in England as when they are in France. Apart from the numerous agents whom the enemy still maintains in England there are there numberless individuals of German birth or sympathies. Even if such individuals do not obtain information directly from officers and men on leave, they will soon obtain it indirectly if all ranks are not particularly careful with regard to what they say to their friends and relations.

6. Too great care cannot be taken in complying with the censorship regulations regarding written correspondence. An idea appears to be current that it is less dangerous to impart information regarding the movements of troops, etc., to a friend in this country than to send the same information home. This idea is entirely false. The recipient of the letter may keep it on his person and be captured or killed by the enemy the following day, thus giving the latter the recent information he so much requires. All correspondence is of value to the enemy and it is therefore of importance that all private correspondence—particularly addressed envelopes—should be destroyed by the recipient as soon as possible.

7. The most effective means of checking activities of spies is to so control the movements of all inhabitants that, to carry out their mission, spies must either constantly bring themselves to notice or break the regulations. Any connivance on the part of officers or men in such breaches of regulations is an offence.

8. The action to be taken in the case of a suspect depends on circumstances. As a general principle far more drastic action may be taken during an advance than during stationary warfare. The following may be taken as a guide:—

(*a*) During mobile operations, any civilian in the fighting area on whom suspicion of espionage rests should be arrested and handed over to the Provost Marshal Branch, together with documents and personal property which appear to have a bearing on the case against him, and which may be required to be used in evidence.

The General Staff, Intelligence Branch, will be immediately informed, and will issue orders as to the disposal of the suspect. Military Courts have no jurisdiction over civilians, except those forming part of our forces in the Field, and therefore subject to Military Law.

All other civilians, of whatever nationality and however strong the *prima facie* case against them, must be dealt with by French or Belgian Military Tribunals, according to the country wherein they are arrested.

(*b*) The papers of any person dressed in uniform, of whatever rank, whose words or actions are suspicious should be examined by any officer, N.C.O. or man on the spot. If this leaves any doubt the suspect should be taken to the nearest officer who will be responsible that he does not escape. If the officer is not satisfied, he should send the suspect to the nearest A.P.M. or Intelligence Officer, or direct to Headquarters of the nearest Brigade, Division, or Corps, who will have inquiries made by the Liaison or Intelligence Officer.

(*c*) During stationary warfare, in cases where a suspect is a civilian domiciled in the locality, the facts should be

reported to the nearest Intelligence Officer or Intelligence policeman, who will be responsible for following up the case. Where, however, there is a reasonable possibility that a suspect may escape he should be detained until the arrival of a representative of the Intelligence.

9. In territory which has been occupied by the enemy particular care must be taken to guard against the working of the enemy's espionage system. During a retreat he may leave agents—either in uniform or dressed as civilians—concealed in ricks, haylofts or woods to observe the movements of our troops and to signal them by means of a telephone or wireless installation. Carrier pigeons are largely used by the Germans, and may be left with spies to communicate information over longer distances than would be possible by telephone.

10. Papers of every sort must be burnt before troops move from a billet or bivouac. All chalk or other marks indicating the units occupying the billets must be removed before departure.

11. If a man has the misfortune to be taken prisoner, he is not to give any information beyond his own name and rank. The enemy cannot and will not compel him to say more—though he may threaten to do so—on the contrary he will respect a man whose courage and patriotism do not fail even though wounded or a prisoner. Prisoners should be on their guard against Germans dressed as British Officers who are employed by the enemy to extract information.

12. It is of the greatest importance that every man in the ranks should be impressed with the necessity of doing everything in his power to combat the enemy's system of espionage, and above all to do nothing to assist him by carelessness in writing, talking, or custody of documents. If circumstances prevent him from giving an evasive answer to a question, such as, "where he has come from" or "where he is going," he should understand that it is a national duty to make a false statement however much he may dislike doing so. It is essential that the whole of the information contained herein be communicated to all ranks.

RECOGNITION OF OUR OWN AGENTS

It is important that persons employed on special missions by the Allied Armies should not be delayed unnecessarily. When, therefore, a person who has been arrested, claims to be employed on such a mission, the facts should be at once reported to higher authority who will, if necessary, communicate with General Headquarters (Intelligence).

Transporting Prisoners

By Captain V. M. Elmore, U. S. Infantry

IN THE winter of 1906 it became my duty to take charge of and convey from Governor's Island, New York, to the military prison at Fort Leavenworth, Kans., 120 general prisoners, probably the greatest number transported at one time from post to prison. They were all long-term men, guilty of serious offenses, and for that reason, and because of their number, a special train was provided.

An outline of the method by which these men were safely conducted halfway across the continent might be of use to other officers given a similar duty in the future. It is a work that requires constant watchfulness and care, and while no particular credit is given for its proper performance, yet, if a prisoner escapes, the officer in charge is apt to be confronted by a court-martial for neglect of duty.

On account of the probability of many friends and the curious-minded coming to the railway station to witness the departure of a large number of prisoners, thereby resulting in lamentable expressions of sympathy, coupled with other disturbances, it is advisable not to let the prescribed time and point of departure become known beforehand to anyone except those directly charged with the movement; and the officer in charge, when traveling by special coach or train, should be particular in seeing that he has in his own possession a copy of the contract or agreement for transportation. Before leaving New York I was careful on this point and obtained a copy of the contract made by the Quartermaster's Department with railway officials as to the composition of and route of my train. This proved to be quite necessary, for after arrival at Chicago the representative of the connecting line there insisted that prisoners and guard be transferred, within the railway yards, to another train, assigning numerous reasons for the transfer. He was shown a copy of the contract and assured that as the train was a special and through one there was no intention to transfer the men from one train to another, either in railway yards or elsewhere, and that there would be no change made whatever until arrival at our destination. The train then proceeded.

Just before departure from Governor's Island the prisoners were handcuffed by twos, a long-term man being attached to a short-term one, the real bad characters thereby not being placed together. There was then read to them the following orders, which had previously been explained to all members of the guard. This was done so that each prisoner could be made thoroughly aware of his real status and his own duties; also to acquaint him with the full knowledge that if he attempted violence of any sort, or to escape, he would be shot.

After entraining no prisoner was handcuffed to a car-seat, this being prohibited by state laws.

The trip was most quiet, orderly and successful, and during the entire journey it did not become necessary to even

caution a guard as to his duties or warn a prisoner as to his conduct. But there was a feeling of profound relief when our personally conducted tour was completed.

INSTRUCTIONS FOR GUARD ON BOARD TRAIN

1. One sentinel will be posted at each door, facing towards prisoners. They will remain on inside of door of car to which they are assigned and will keep such door shut, opening same only when necessary for members of train crew or soldiers on duty to pass through the car. They will not sit down and will keep all prisoners in their car constantly under close observation.

2. Should any prisoner make any movement, as if attempting to escape, the sentinels will order him to "Halt"; failing to obey such order the prisoner will be promptly fired on, a careful aim being taken.

3. All windows will be kept shut and closed tightly, ventilation being secured through transoms overhead.

4. No conversation will be allowed between any civilian and any prisoner at any time. Loud talking, singing, or any boisterous language by prisoners is strictly prohibited, and any notes attempted to be passed by one prisoner to another will be taken charge of and the name of the offending prisoner promptly reported to the officer in charge. Sentinels will not speak to prisoners except to give orders of instructions.

5. Should any prisoner desire to speak to the corporal of the guard he will hold up one hand to indicate such desire, whereupon the sentinel will call the corporal by notifying the next sentinel nearest where the corporal is stationed. In so doing he will be careful to keep prisoners under observation, and a door will not be opened except when absolutely necessary to attract the attention of the sentinel in the next car. Should the prisoner's desire to speak to the corporal appear to be frivolous the name of such prisoner will be promptly reported to the officer in charge.

6. Immediately after breakfast the sergeant of the guard will detail two members of the guard longest off duty to report to each car for the purpose of taking prisoners to closet. Only two prisoners will be taken at a time and the prisoners will not be allowed to close the closet door, but will remain under immediate observation of the sentry in charge of them. Sentinels at the car doors will be particularly careful at this time to see that no prisoner attempts to snatch the rifle or arms of the sentinels taking prisoners to closet.

7. Each car will be cleaned up thoroughly each morning, beginning at 8 o'clock, each seat being cleaned out by prisoners occupying same, the rubbish being placed in the aisle. After prisoners have returned from closets the two sentries detailed to guard them will then select two prisoners to gather and sweep up the trash and rubbish in the aisle, which will be emptied through the closet stool, no car door being opened for this purpose.

8. When sentinels are guarding prisoners at work, or when two sentries are conducting prisoners to the closet, they will remain at least 10 feet apart—one in front of the other—the one in rear being careful to see that no prisoner attempts to snatch the arms of the sentry in front, the sentinels on duty at the doors also carefully watching to prevent any such violence.

9. All noncommissioned officers and men are especially enjoined that they must be careful not to allow any prisoner to have the slightest opportunity of seizing revolvers or rifles. If any prisoner makes an attempt to violate this paragraph, he will be immediately fired on, careful aim being taken. Bayonets will not be worn.

10. On going on duty each noncommissioned officer will see that the piece of each sentinel is loaded with five rounds of ball ammunition. Rifles and revolvers will be unloaded when coming off sentry duty, but they will not be unloaded until the relief going on post

have loaded their pieces. In unloading care will be taken that the muzzles are pointed towards the roof of car. Under no circumstances will revolvers or rifles be left or placed where it would be possible for any prisoner to lay hands on same.

11. Meals will be served at the hours directed by the officer in charge. They will be obtained from the baggage car by two men (detailed by sergeant of the guard from men longest off guard duty). This detail will bring the food for the prisoners in the car, place it within the car door and it will then be served to prisoners by the two prisoners selected for fatigue duty. Prisoners will not be allowed to leave their seats for the purpose of obtaining food. Water will be served to prisoners in a bucket provided for that purpose, it being carried by a prisoner selected from the center or near the center of the car. While food is being served to prisoners they will be carefully watched by the two sentinels who were detailed for guarding prisoners at closet and during fatigue. Prisoners will not be allowed to use knives or forks while eating or at any other time; spoons will be provided instead. On the conclusion of the morning and evening meal a search will be made by one sentinel for knives and forks, the other extra sentinel remaining 10 feet away and guarding the search. Such search will be most carefully made of each prisoner's person and of each seat. Should any knife, fork, or other contraband article be discovered it will be taken possession of immediately, the name of the prisoner will be at once reported, and he will be placed in double irons.

12. About fifteen minutes before sunset all lights in each car will be lighted so as to burn freely; they will so remain until broad daylight.

13. The corporal of the guard will inspect the entire train once every hour, reporting the result to the sergeant of the guard. Corporals will go on duty as corporal of the guard for four hours at a time, being then relieved for eight hours. They will, in addition to their rifles, be armed with loaded revolvers.

14. The sergeant of the guard will inspect the train once every four hours (on the half-hour), reporting the result immediately to the officer in charge. Sergeants will go on duty as sergeant of the guard for twelve hours at a time, being then relieved for twelve hours. They will be armed with loaded revolvers.

15. In all cases revolvers will be worn slipped to the front.

16. Inspections will be made regularly by the officer in charge at 9 o'clock a. m., 3.00 p. m. and at 11.00 p. m. Other inspections will be made by him as often as deemed necessary.

17. On the approach of an officer to enter a car all prisoners in such car (who are not asleep) will, when the nearest sentinel calls "Attention," fold their arms and sit upright, remaining in such position until the officer has left the car.

18. Should any disorder or disturbance be created by any prisoner, sentinels will call "Attention." At this command all prisoners will sit upright in their respective seats with arms folded. Any prisoner who fails to seat himself promptly and fold his arms as herein directed will be considered as being a participator in the disturbance and thereby subject himself to the risk of being shot by both sentinels.

19. Posts will be numbered in numerical order, from rear to head of train, No. 1 being nearest the car occupied by the officer in charge.

20. Should any prisoner jump from the train while it is in motion the sentinel first observing such prisoner will bring the train to a stop by pulling the cord overhead provided for that purpose.

21. Should the train be brought to a sudden and unexpected stop, or in case of accident, sentinels will make prisoners remain in their seats so as to prevent any panic or rush by them. In case of serious accident sentinels will open the doors and take post on the side of the car opposite the steps—odd numbered sentinels landing on the *right* side of car and facing toward the head, even

numbered sentinels landing on the left and facing toward the rear, both sentinels seeing that no prisoner attempts to escape after landing on the ground. Prisoners on the right side of car will detrain through the rear door, and prisoners on the left side of car will detrain through the front door. As soon as all prisoners have detrained they will then be marched about 100 yards away from the train, made to sit down, and there held to await further orders. The sergeant of the guard, accompanied by two men, will then make a thorough inspection of each car.

22. Between 6 o'clock in the morning and 8 o'clock in the evening two members of a relief will be assigned seats in the car which their relief is to guard, these two members being the two men who are next to be stationed as sentinels at the doors of the car. Their seats will be together and nearest the rear door; their arms will be kept between them and the side of the car. In case the train is brought to a permanent stop these two men will detrain from the car's rear platform, one being posted on the right and one posted on the left of the steps, both facing toward the front.

23. Immediately after entraining, all prisoners will be required to remove their shoes. These shoes will be placed in a corner of the car occupied by the prisoners, each pair of shoes being tagged with the owner's name. They will not be returned to the prisoners until the officer in charge so directs.

24. *Prisoners will always be made to seat facing to the front.*

25. When not actually in the performance of duty members of the detachment will remain in the tourist sleeping car regularly assigned for the guard. They are strictly prohibited from passing from one car to another, and no member of the detachment will be allowed to land except in compliance with an order from the officer or noncommissioned officers in charge. Any violation of this order will be brought to trial.

26. The introduction or use of any intoxicating liquor whatsoever, by any member of the detachment while on this journey, is positively prohibited. Any violation of this order will be punished as a wilful disobedience of orders, under the 21st Article of War.

27. All members of the detachment are particularly enjoined that only by careful watchfulness and a strict compliance with instructions, coupled with presence of mind, can proper guarding of prisoners be accomplished.

28. Sentinels at car doors will be posted every two hours, being then relieved for six hours.

29. These orders will be read by the corporal of the guard to each man in his relief at the first oportunity, and he will see that each member of his relief clearly understands them. Three copies will be kept on hand in tourist sleeping car for careful study by each man before going on duty.

Farm Homes for Soldiers

SECRETARY of the Interior Lane authorizes publication of the following:

DEPARTMENT OF THE INTERIOR

WASHINGTON, May 31, 1918.

MY DEAR MR. PRESIDENT: I believe the time has come when we should give thought to the preparation of plans for providing opportunity for our soldiers returning from the war. Because this department has handled similar problems I consider it my duty to bring this matter to the attention of yourself and Congress.

Every country has found itself face to face with this situation at the close of a great war. From Rome under Caesar to France under Napoleon down even to our own Civil War, the problem arose as to what could be done with the soldiers to be mustered out of military service.

AT THE CLOSE OF THE CIVIL WAR

At the close of the Civil War America faced a somewhat similar situation. But fortunately at that time the public domain offered opportunity to the home-returning soldiers. The great part the veterans of that war played in developing the west is one of our epics. The homestead law had been signed by Lincoln in the second year of the war, so that out of our wealth in lands we had farms to offer the millions of veterans. It was also the era of transcontinental railway construction. It was likewise the period of rapid, yet broad and full, development of towns and communities and states.

To the great number of returning soldiers land will offer the great and fundamental opportunity. The experience of wars points out the lesson that our service men, because of army life, with its openness and activity, will largely seek out-of-doors vocations and occupations. This fact is accepted by the allied European nations. That is why their programs and policies of relocating and readjustment emphasize the opportunities on the land for the returning soldier. The question then is: "What land can be made available for farm homes for our soldiers?"

PUBLIC LANDS UNOCCUPIED NOW

We do not have the bountiful public domain of the sixties and seventies. In a literal sense, for the use of it on a generous scale for soldier farm homes as in the sixties, "the public domain is gone." The official figures at the end of the fiscal year, June 30, 1917, show this: We have unappropriated land in the continental United States to the amount of 230,657,755 acres. It is safe to say that not one-half of this land will ever prove to be cultivable in any sense. So we have no land in any way comparable to that in the public domain when Appomattox came and men turned westward with army rifle and "roll blanket" to begin life anew. While we do not have that matchless public domain of '65, we do have millions of acres of undeveloped lands that can be made available for our home-coming soldiers. We have arid lands in the west; cut-over lands in the northwest, Lake states, and south; and also swamp lands in the middle west and south, which can be made available through the proper development. Much of this land can be made suitable for farm homes if properly handled. But it will require that each type of land be dealt with in its own particular fashion. The arid land will require water, the cutover land will require clearing, and the swamp land must be drained. Without any of these aids they remain largely "No man's land." The solution of these problems is no new thing. In the admirable achievement of the Reclamation Service in reclamation and drainage we have abundant proof of what can be done.

THE RECLAMATION SERVICE

Looking toward the construction of additional projects, I am glad to say that plans and investigations have been under way for some time. A survey and study has been in the course of consummation by the Reclamation Service on the great Colorado Basin. That great project, I believe, will appeal to the new spirit of America. It would mean the conquest of an empire in the southwest. It is believed that more than 3,000,000 acres of arid land could be reclaimed by the completion of the upper and lower Colorado Basin projects.

It has been officially estimated that more than 15,000,000 acres of irrigable land now remain in the Government's hands. This is the great remaining storehouse of government land for reclamation. Under what policy and program millions of these acres could be reclaimed for future farms and homes remains for legislation to determine. The amount of swamp and cut-over lands in the United States that can be made available for farming is extensive. Just how much there is has never been determined with any degree of accuracy. Practically all of it has passed into private ownership. For that reason, in considering its use it would be necessary to work out a policy between the private owners and the Government unless the land was purchased.

SWAMP AND OVERFLOWED LANDS

It has been estimated that the total area of swamp and overflowed lands in the United States is between 70,000,000 and 80,000,000 acres. Of this amount it is stated that about 60,000,000 acres can be reclaimed and made profitable for agriculture. The undeveloped swamp lands lie chiefly in Florida, in the states along the Atlantic and Gulf coasts, in the Mississippi Delta, and in Missouri, Indiana, Michigan, Minnesota, Wisconsin, and California.

What amount of land in its natural state unfit for farm homes can be made suitable for cultivation by drainage, only thorough surveys and studies can develop. We know that authentic figures show that more than 15,000,000 acres have been reclaimed for profitable farming, most of which lies in the Mississippi River Valley.

AMOUNT OF CUT-OVER LANDS

The amount of cut-over lands in the United States, of course, it is impossible even in approximation to estimate. These lands, however, lie largely in the South Atlantic and Gulf States, the Lake States, and the Northwestern States. A rough estimate of their number is about 200,000,000 acres; that is, of land suitable for agricultural development. Substantially all this cut-over or logged-off land is in private ownership. The failure of this land to be developed is largely due to inadequate method of approach. Unless a new policy of development is worked out in cooperation between the Federal Government, the States, and the individual owners a greater part of it will remain unsettled and uncultivated. The undeveloped cut-over lands lie chiefly in the Pacific Northwest (particularly in Washington and Oregon), in the Lake States (Minnesota, Michigan, and Wisconsin), and in the South Atlantic and Gulf Coastal States (Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas).

FREE OR CHEAP ERA PASSED

Any plan for the development of land for the returning soldier will come face to face with the fact that a new policy will have to meet the new conditions. The era of free or cheap land in the United States has passed. We must meet the new conditions of developing lands in advance—security must to a degree displace speculation. Some of the defects in our old system have been described by Dr. Elwood Meade in these words:

"Science [should] have gone hand in hand with the settlement of the arid and semiarid country, and all that science could give would have been utilized, first, in the creation of the conditions of settlement, and then in aiding the settler in difficult tasks. Because nothing was done these heroic but unin-

formed souls were bedeviled by the winds, cold, drought, and insect pests. They wasted their efforts, lost their hopes and ambitions, and a tragic percentage left, impoverished and embittered. The tragic part of this history is that nearly all this suffering and loss could have been avoided under a carefully thought-out plan of development."

TENDENCY TO FARM TENANCY

There are certain tendencies which we ought to face frankly in our consideration of a policy for land to the homecoming soldier. First, the drift to farm tenancy. The experience of the world shows without question that the happiest people, the best farms, and the soundest political conditions are found where the farmer owns the home and the farm lands. The growth of tenancy in America shows an increase of 32 per cent for the 20 years between 1890 and 1910. Second, the drift to urban life. In 1880, of the total population of the United States 29.5 per cent of our people resided in cities and 70.5 per cent in the country. At the census of 1910, 46.3 per cent resided in cities and 53.7 per cent remained in the country. It is evident that since the war in Europe there has been a decided increase in the trend toward the city because of industrial conditions. The adoption by the United States of new policies in its land-development plans for returning veterans will also contribute to the amelioration of these two dangers to American life.

SUCCESS OF DEVELOPMENT PLAN

A plan of land development, whereby land is developed in large areas, subdivided into individual farms, then sold to actual bona fide farmers on a long-time payment basis, has been in force, not only in the United States under the reclamation act, but also in many other countries for several years. It has proved a distinct success. In Denmark, Ireland, New Zealand, and the Australian Commonwealth it has completely changed the land situation. One of the new features of this plan is that holders are aided in improving and cultivating the farm. In a word, there is organized community development. Its beneficial results have been well described by the Canadian commission which was appointed to investigate its results in New Zealand in these words:

". . . the farmers have built better houses or remodeled their old ones, brought a larger acreage of land under cultivation that would otherwise be lying idle; have bought and kept better livestock; have bought and kept better labor-saving machinery on the farms and in the houses. . . . They keep more sheep and pigs and have so largely increased the revenue from their farms that they are able to meet the payments on the mortgages and to adopt a higher standard of living, and a better one. Throughout the country a higher and better civilization is gradually being evolved; the young men and women who are growing up are happy and contented to remain at home on the farm and find ample time and opportunity for recreation and entertainment of a kind more wholesome and elevating than can be obtained in the cities."

It may be said that this country outside of Alaska has no frontier today. Of course, Alaska will still offer opportunity for a pioneer life. And, of course, Alaska likewise has yet unknown remarkable agricultural possibilities, but unless we make possible the development of this land by the men who desire their life in that field, we will lose a great national opportunity.

This is an immediate duty. It will be too late to plan for these things when the war is over. Our thought now should be given to the problem. And I therefore desire to bring to your mind the wisdom of immediately supplying the Interior Department with a sufficient fund with which to make the necessary surveys and studies. We should know by the time the war ends not merely how much arid land can be irrigated, nor how much swamp land reclaimed, nor where the grazing land is and how many cattle it will support, nor how much cut-over land can be cleared, but we should know with definiteness where it is practicable to begin new irrigation projects, what the character

of the land is, what the nature of the improvements needed will be, and what the cost will be. We should know also, not in a general way, but with particularity, what definite areas of swamp land may be reclaimed, how they can be drained, what the cost of the drainage will be, what crops they will raise. We should have in mind specific areas of grazing lands, with a knowledge of the cattle which are best adapted to them, and the practicability of supporting a family upon them. So, too, with our cut-over lands. We should know what it would cost to pull or "blow-out" stumps and to put the lands into condition for a farm home.

DEFINITE PLANNING BASIS

And all this should be done upon a definite planning basis. We should think as carefully of each one of these projects as George Washington thought of the planning of the city of Washington. We should know what it will cost to buy these lands if they are in private hands. In short, at the conclusion of the war the United States should be able to say to its returned soldiers, "If you wish to go upon a farm, here are a variety of farms of which you may take your pick, which the Government has prepared against the time of your returning." I do not mean by this to carry the implication that we should do any other work now than the work of planning. A very small sum of money put into the hands of men of thought, experience, and vision will give us a program which will make us feel entirely confident that we are not to be submerged, industrially or otherwise, by labor which we will not be able to absorb, or that we would be in a condition where we would show a lack of respect for those who return as heroes, but who will be without means of immediate self-support.

A million or two dollars, if appropriated now, will put this work well under way.

NOT A CHARITY TO THE SOLDIER

This plan does not contemplate anything like charity to the soldier. He is not to be given a bounty. He is not to be made to feel that he is a dependent. On the contrary, he is to continue in a sense in the service of the Government. Instead of destroying our enemies, he is to develop our resources.

The work that is to be done, other than the planning, should be done by the soldier himself. The dam or the irrigation project should be built by him; the canals, the ditches, the breaking of the land, and the building of the houses should, under proper direction, be his occupation. He should be allowed to make his own home, cared for while he is doing it, and given an interest in the land, for which he can pay through a long period of years—perhaps thirty or forty years. This same policy can be carried out as to the other classes of land. So that the soldier on his return would have an opportunity to make a home for himself, to build a home with money which we would advance and which he would repay, and for the repayment we would have an abundant security. The farms should not be turned over as the prairies were — unbroken, unfenced, without accommodations for men or animals. There should be prepared homes, all of which can be constructed by the men themselves and paid for by them under a system of simple devising by which modern methods of finance will be applied to their needs.

NOT A UTOPIAN VISION

As I have indicated, this is not a mere Utopian vision. It is, with slight variations, a policy which other countries are pursuing successfully. The plan is simple. I will undertake to present to the Congress definite projects for the development of this country through the use of the returned soldier by which the United States, by lending its credit, may increase its resources and its population and the happiness of its people with a cost to itself of no more than the few hundred thousand dollars that it will take to study this problem through competent men. This work should not be postponed.

Cordially and faithfully yours,

FRANKLIN K. LANE.

THE PRESIDENT,
The White House.

Coleman Hold and Trigger Squeeze Device

By Lieut. Col. W. P. Coleman, 341st Infantry, N. A.

FOR those officers who have given serious thought and study to instruction in rifle firing, the most difficult task is to teach what "Hold and Squeeze" really means.

It is comparatively easy to teach the recruit the theory of sights and, if his interest is properly maintained, the monotonous push and pull drills bring us the results desired, but when we come to the instruction in holding the rifle and squeezing the trigger we can only coach and beg, for it is like taking a horse to water—the animal may drink or not, and it is just so with the recruit—he may hold and squeeze if he makes a conscientious effort, but the instructor is powerless to force this effort.

It appears to be very well agreed that, before a man can be taught to shoot a rifle properly, he must be made to realize that at the time of aiming the piece his attention and effort must be concentrated on something else than the explosion; that is, the act of squeezing the trigger is incidental and the main duty at this time is to hold on the target. It also appears to be accepted that even with old shots there is a tendency to jump when the rifle is fired, and if this jump is anticipated, as is unconsciously done when one jerks the trigger, the jump deranges the aim at the critical time and the shot misses the mark. In other words, men must be taught to deceive themselves as to the exact moment the rifle is fired, and we do this by requiring them to concentrate on the hold, the squeezing being so gradual that the explosion cannot be anticipated.

The Coleman Hold and Trigger Squeeze Device.

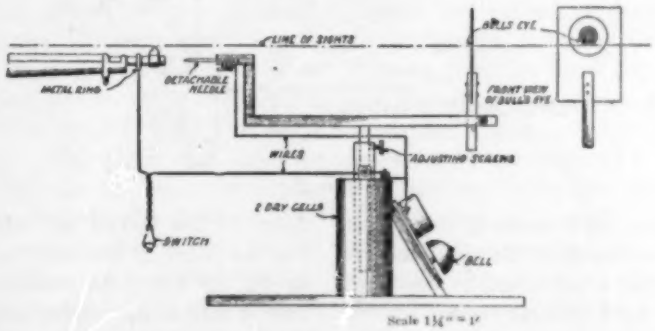


FIG. 1.

When the above conclusions were reached it became plainly apparent to me that there was need for some mechanical device to drive home the necessity to concentrate on the "Hold," so as to bring home to the recruit and make plainly apparent to him his inability to grasp what is meant by "Hold and Squeeze." So I began to think of

some combination that would serve this end and the Coleman Hold and Trigger Squeeze Device is believed to accomplish the purpose.

If a man does not know how to hold his rifle steady while squeezing the trigger, the device will show him up. It also drives home the fact that the recruit must concentrate on the "hold," the trigger squeeze being incidental; that is, it may occur any time while the piece is being properly held, and it is this point that we must emphasize, for when the novice is so much absorbed in holding that his mind does not concern itself with the explosion, he has overcome the most difficult feature of rifle shooting.

The device has been given to the War Department and accepted. It can be constructed by a company mechanic.

To shoot a rifle effectively one must be brought to a realization of what "hold and squeeze" means. To do this successfully is the most difficult step in the instruction. And while there are many devices that teach men to become good shots, they do not isolate the test of holding and squeezing, but, like gallery practice, combine it with other features of the instruction.

By this device a soldier's inability to properly hold and squeeze becomes plainly apparent to himself and his instructor and therein lies its merit.

Use.—The sling is adjusted for use in the prone position and is placed on the left arm of the recruit, who cocks his piece and takes the prone position. The device is placed immediately in front of the recruit and near enough for the point of the detachable needle to slightly enter the muzzle when the rifle is held in the aiming position with the line of sight touching lower edge of bull's-eye on miniature target.

As soon as rifle becomes steady, indicating a proper aim, the switch is closed and the recruit is required to squeeze the trigger and snap the piece without causing the bell to ring, for any decided movement of the rifle will cause the point of the needle to touch the side of the bore and the bell will ring.

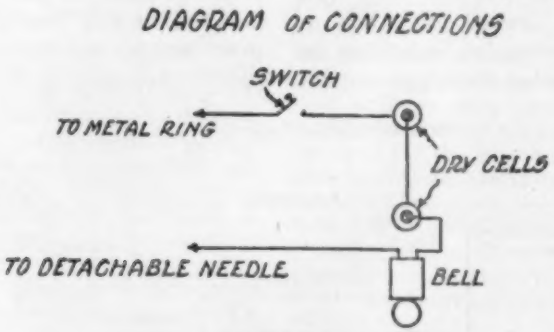


FIG. 2.

Loyalty

By Captain Frank P. Tebbetts, O. R. C.

LOYALTY is one of the necessary qualifications of any military organization. A company commander who does not have the absolute loyalty of his officers and noncommissioned officers cannot successfully direct what has been called "the most important command in the Army." Notwithstanding his tremendous authority, intimate contact with his men, and his almost unlimited field for initiative and original development, it is impossible for him to administer his command alone. It has been repeatedly demonstrated that a "one-man company," fails to meet the test of military efficiency. Conscientious but inexperienced individuals who have built that kind of an outfit have almost without exception witnessed its decline when the single personally upon which the structure rested was removed and the organization was left to go on alone. A good company commander is the nearest thing we have to a perfect military leader in modern warfare. What is true of him and his problems is true, in perhaps a slightly different degree, in every other department of the army.

Loyalty is a soldierly quality of equal importance with discipline, that iron framework upon the solidity of which the success of all military work must stand or fall. Together with discipline and morale, its presence points the way to success, as its absence points the way to failure. Discipline demands of every soldier *immediate, complete*—and *unquestioned* obedience to superiors. Loyalty goes further than that and demands that this obedience be both *cheerful* and *uncomplaining.*

Loyalty means that when we are told by a superior to do something, even if to us the thing directed to be done appears unnecessary, untimely, or even absurd, we must not only do it promptly, but do it *cheerfully.* It means, moreover, that we must consider the matter a closed incident, however much we may personally differ in our views from the superior who gave the order. Loyalty does not mean that we can *obey* and then go outside, or with other officers, or to the public, or even to our closest friends and express privately our contempt for the superior or the order. Loyalty does not mean that if we are called on the carpet and admonished for a mistake, that we can listen silently, be outwardly respectful, and then go aside and pour our complaints into other ears and harbor resentment against the officer who administered the rebuke. Obedience of that sort is unfortunately rather the commonest kind of obedience. But such obedience is very clearly not loyalty. It is not only disloyalty, but it is destructive of discipline and morale, without which no true military organization can live or prosper.

Loyalty is that earnest, whole-hearted devotion to a superior which enables us not only to follow his leadership, but to follow it unreservedly and to the last ultimate requirement, without question or complaint. It does not require us to admire the man individually, but it does require us to regard his word as our law, his orders as our orders, and

his plans as our plans; without suggesting, *even to ourselves,* that his demands are unreasonable. Until the man in uniform has learned this lesson, he is not a soldier, whatever other qualifications he may possess, regardless of his training and experience or of the rank to which he may have attained. No army can hope to be more than a disorganized rabble until the individuals composing it have learned to be loyal. No military organization is properly constructed or knit soundly together until its members have come to be loyal to their superiors.

Loyalty is not a requisite alone of soldiers in the field. In fact, it is of greater importance to develop that quality in officers and men who are temporarily removed for practical reasons from the splendid discipline and exactions of field operations. There is very little difference, after all, between an order to proceed with a bill of specifications for material and an order to advance under fire on a given objective at a stated time. The principles involved are precisely the same. The man who would perform the one task faithfully should perform the other task faithfully. To question the authority of the order, or to complain of its unreasonableness in either case, would be evident disloyalty. It may not be inopportune to direct attention to the fact that *any* officer, regardless of the nature of his duties, may measure the quality of his service by his willingness to *obey* instantly and cheerfully any order that be given him by competent authority, and by his capacity for being uncompromisingly *loyal* to those under whom it is his fortune to serve.

Varied Ground

Secrecy

The Germans realize that the measure of success attending the battles they are now waging will be appreciably enhanced if they can succeed in deceiving their enemy up to the last moment where, when, and how they intend to deliver the attack. They feel that now, more than ever, it is the solemn duty of every soldier from the commander down to the last private to remain strictly silent regarding events which must come to his knowledge in the course of his duties. They realize that every conceivable precaution has to be taken to prevent knowledge of their preparations from reaching their enemy and how necessary it is that every order on this subject must be strictly obeyed. They know that without the intelligent cooperation of every man in the trenches, of every gunner, of every transport driver and of every man of labor units, this goal will not be reached. Every man in their army had it impressed upon him before they advanced in March, 1918, that the fight had already begun; the fight for secrecy, the fight for concealment of their preparations. It was urged upon every man, long before the armies moved forward, that he himself had his part in that fight and had to be armed with the weapons of caution and silence, in order to survive it. Only if they won that would they clear the way of their battalions to their objectives.

In order to impress this upon every German soldier, every unit was instructed once or twice a week in the nature and purpose of secrecy. They were told the value of conversations and correspondence to the espionage system of their enemy. The measures of precaution to be taken in the battle zone, on the march, in billets, etc., in order to conceal the German preparations, were explained. They were shown reproductions of airplane photographs of their enemy and their own successful and unsuccessful attempts at concealment. The men were to draw their own conclusions from them, which were to be illustrated by examples from German experience.

In order to conceal movements in rear of the line all groups were required to divide the ground between them and their enemy into two zones, the one under hostile observation from the ground and the one under observation from hostile balloons. Circulation in the first zone was limited to 4 men on foot on bright days and 40 men on dull days, 2 mounted men on bright days and 20 on dull, 1 vehicle on bright days and 10 on dull. In the zone under air observation on bright days 40 men on foot, 20 on horseback and 10 vehicles were the maximum groups to move together. On dull days no column longer than 220 yards, with minimum intervals of 550 yards between columns, was permitted. Officers and sentinels were charged with the exact enforcement of these orders.

The measure of the success attained can be given from our own newspaper accounts of the German attack of March, 1918.

The ideal in war is that an army should strike like lightning from the clouds. The cloud should overhang and darken the faces of the enemy until

the lightning rends it. It is a cloud of silence and of secrecy and it is the duty of every man to maintain it, to move in it until the orders for the advance are given. Not only his life but the success of the common cause is at stake.

The time has passed when a poet could write:

> Theirs' not to reason why;
> Theirs' but to do and die.

The time has come when every man must know *why* within the limits of his duties, indeed at the very last when the blow is delivered, it might be such that every man should know what the General-in-Chief had ordered. Then he can put his shoulder to it and work with full effect. Napoleon at Austerlitz tried this, and he knew war. Then and then only can men not "do and die" but do and win.

The military secrecy which is so necessary for the success of operations —and part of the success of operations is avoiding being killed—weighs upon every one concerned in them. It is not sufficient to give orders to others and then fail to execute them oneself. It is extremely easy and common to obey orders literally and then think they have been obeyed fully. You have not obeyed them unless you have obeyed their spirit. For example, we all know that the Germans are doing their best to sink one of our transports and drown the troops on it. It is true that so far their best has not been good enough, but we can take no chances. The regulations enjoining secrecy concerning the movement of troops, all movements of troops, have a real importance, and yet there are many officers who do not realize that these orders apply to them. For example, lately a man happened to be in a New York hotel when forty or fifty officers arrived. Every one of them registered his name and home camp and most of them their commands. Anyone coming into the hotel could trace easily the entire movement to the seaboard by the hotel registers. The clerk said that the rule was general and that naval officers registered their ships: "An English naval officer," he said, "never does such a thing, and he won't answer a question as to what ship he came from."

It ought to be obvious enough now that we have been at war for over a year, that officers who stop at hotels at shipping points should not designate from what points they come, and in no case should they give their regimental assignment. The most stupid German agent could take the registers of the New York hotels, which may be seen by any casual visitor who loafs up to the desk, and follow in detail a divisional movement.

The registration, Major John Smith, U. S. A., or U. S. N. A. or U. S. N. G., ought to fully cover the case and settle a bad situation. Any censorship on the movement of troops is a joke when officers tell the whole story in public hotels.

Awards for Gallantry in Action, U. S. Army

The Medal of Honor and the Distinguished Service Cross are awarded for gallantry in action.

The Medal of Honor is confined to officers and soldiers of the U. S. Army whose action complies with the following tests:

a. Who have performed in action deeds of most distinguished personal bravery and self-sacrifice.

b. Above and beyond all calls of duty.

c. So conspicuous as clearly to distinguish them for gallantry and intrepidity above their comrades.

d. Which involve risk of life or the performance of more than ordinarily hazardous service.

e. The omission of which would not justly subject the person to censure as for shortcoming or failure in the performance of his duty.

The award of the Distinguished Service Cross is confined to anyone who may distinguish himself or herself by *extraordinary heroism* in connection with military operation against an armed enemy of the United States under circumstances which do not justify the award of the Medal of Honor, and may be awarded to any person who, while serving in any capacity with the army, has distinguished himself or herself. Accordingly this cross can be given to members of the allied forces.

The Distinguished Service Medal will be confined to anyone who distinguishes himself or herself by exceptionally meritorious service to the Government in a duty of great responsibility in time of war, or in connection with operations against an armed enemy of the United States. It accordingly can be given to members of the allied forces and apparently also to persons in the United States who come within the above provisions.

There has been some misapprehension regarding the distinction between the class of cases for which the Distinguished Service Cross and Distinguished Service Medal are granted. Some apparently have had the idea that both were given for gallantry, the medal being awarded for less distinguished gallantry than the cross. This is an erroneous idea. The Distinguished Service Cross is given for gallantry—"extraordinary heroism." The medal is given for exceptionally meritorious service in a duty of great responsibility. The Distinguished Service Medal may properly be granted to persons serving far from the theater of hostile operations, even to those serving in the United States. It might also be properly granted to commanders or members of their staff holding responsible positions for exceptionally able performance of duties, though no particular act of bravery be involved, or to any others performing exceptionally meritorious service in a duty of great responsibility.

Overseas Equipment

In view of the late limitations upon the baggage of officers going abroad for overseas service, it is impossible to take all of the articles enumerated in the official list of what should be taken; furthermore it is understood that at least some of the articles enumerated there can now be obtained in France. Among these are trench boots, rubber boots, Sam Browne belt and overseas cap.

The following list has been made out by an officer who has been abroad, and it is suggested as comprising the essential articles which can be carried within the limitations ordered. It must be remembered that France is not as hot as the United States and that it is better to take things which can be worn in the winter.

EQUIPMENT

Locker

Breeches (2 pairs).
Coats, service (1).
Drawers, wool (4).
Flashlight, with extra batteries.
Gloves, riding (pair).

Gloves, woolen (2 pairs) (?).
Laces, shoes, extra (4 pairs).
Leggings, spiral.
Moccasins, to ankle, large.
Overshoes, arctic.
Shirts, O. D. (3).
Socks, heavy (6).
Tape (for iden. tag).
Undershirts, wool (4).
Watch, extra (1).

Supplies

(To be carried in above)

Tobacco.
Soap.
Tooth powder.
Matches.

Horse Equipment Box

Saddle and pad.
Saddle-bags.
Bridle.
File of official books.

Bedding Roll

Basin, canvas.
Blanket.
Boots, leather (1 pair).
Bucket, canvas.
Canteen.
Sleeping bag, wool.
Sleping bag, quilted.
Shoes, pairs (2).
Raincoat.
Sweater (?).
Hood, wool (?).
Muffler.
Overcoat, short furlined (?).
Tub, rubber.
Spurs, extra (1).
Pillows, air (2).
Wristlets.
Ear muffs.
Haversack.

On Person

1 O. D. uniform, leather leggings.
1 overcoat.
1 cap, service.
1 field belt.
1 pistol.
2 magazine carriers, with extra magazines.
1 first-aid pouch.
1 field glass, with compass.
1 dispatch case, containing note book and pencils, road runner.
2 identification tags.

Handbag

Roll of toilet articles.
Pajamas, heavy (2).
Drawers, cotton (6).
Undershirts, cotton (6).
Socks, light wool (12).
Shirts, white (6).
Handkerchiefs (12).
Collars, white (12).
Towels, face (4).
Towels, bath (2).
Soiled clothes bag.
Portfolio, leather, with note paper and envelopes.
Housewife.
Shoe brush and polish (Lutetian cream best).

Demobilization

In Great Britain the committee appointed to consider the resettlement of officers has been approved by the Minister of Reconstruction and, in accordance with its recommendations, the Minister of Labor is proceeding to set up a department to be known as the "Appointments Department" in order to provide professional and business positions on their return to civil life. The department will be represented in the provinces by branch offices. The Professional and Business Register of the Ministry of Labor and the Officers' Technical Training Courses of the Ministry of Munitions will be merged in the new department. With it will be associated two committees, one dealing with questions affecting appointments and the other with questions of training. No fees will be charged either to the applicants for positions or to employers.

With us our man power has not been as completely mobilized as in Great Britain; that is, the percentage of men

of military age who have been called to service is not so great, but there is with us a dislocation of industry owing to the war, and it will go on increasing until the end. Acordingly, even if such a bureau as has been established in Great Britain is not necessary now, it may become expedient. If this war is over in six months, almost all of the men engaged will go back to their former occupations, but the longer it lasts the greater will be the number who will want to try something else, partly because their places have been filled—unsatisfactorily filled probably, but still filed; but chiefly because, as time goes on, men in the service with new horizons, new aspects toward life, will think of change, of doing something different—once it is all over—from what they were doing in the past. Such a bureau would mean much to them. It would really be a sort of employment agency, a place to bring men and jobs together. It should hardly give advice. That is a risky business.

The Province of Ontario Land Settlement Scheme for Returned Soldiers and Sailors[1]

To all returned men, desirous of going on the land, the Province of Ontario offers 80 acres of rich agricultural land, with a 10-acre clearance, free of charge.

Instruction in agriculture is provided, and military pay with regular allowance for dependents of married men is allowed during the training period, and until men are located on their own farms.

Men interested should communicate with the Deputy Minister of Lands and Forests, Parliament Buildings, Toronto, Canada.

HONORABLE G. H. FERGUSON,
Minister, Lands, Forests and Mines.

Universal Training[2]

CHICAGO, June 15.—The sixty-ninth annual convention of the American Medical Association has adjourned after the house of delegates had unanimously adopted a resolution urging compulsory military training for all young men before they are permitted to vote. The text of the resolution was as follows:

Whereas the partial inventory of our national health made possible by the physical examinations under the selective draft act showed a large percentage of our young men unfit for military service, and, further, that as most of these disabilities are curable, the American Medical Association is prompted to speak formally on this subject; and,

Whereas, in view of the wonderful mental and physical benefits which have been manifested in the young manhood of America through intensive military training in the National Army cantonments; and,

Whereas, knowing that this training has done much to inculcate the knowledge and value of sanitation and personal hygiene in the individual; therefore, be it

Resolved, That the American Medical Association urge the early adoption of a permanent national policy of universal military training for all young men before the right of suffrage is granted them.

War and the Universities

Col. R. V. K. Applin, of the General

[1] *The Canadian Military Gazette*, Ottawa, Canada, June 11, 1918.
[2] *The Evening Star*, Washington, June 15, 1918.

Staff of the British army and head of the British machine-gun mission to this country, who left Ann Arbor recently after addressing the cadets the previous afternoon, gives the following as a parting message to the students of Michigan, and especially to those who intend to become officers:

America's problem at the present time is to obtain officers for the new army. It is not enough that these officers be well drilled; they must possess as well the special qualifications which will enable them to have influence and power over the men they are to train and later command in battle.

Train for New Life

The universities of America are the natural places to look for these men. Unfortunately, however, the quiet atmosphere of university life and the peaceful outlook on life of the average student are the exact antithesis of the training necessary for war, and the first sacrifice that the student is called upon to make as he "lays down the pen for the sword," is to throw away all his preconceived ideas, both here and in the future, and to train himself for a new life of duty and sacrifice for America.

The first and greatest qualification is efficiency and thoroughness in everything that he does. He must indeed put off the old man of civilian habits and put on the new man of alertness, smartness, and soldierly bearing. No detail of dress, deportment, or carriage must be too small for his attention. He must strive in all these things to look the part he is to play, remembering that he is the living representative of America and all that America stands for.

Must Demand Loyalty

The second point is loyalty. Naturally he will be loyal to his country, flag and university, but a great deal more is required of the perfect soldier. He must give devoted and unswerving loyalty from the President down to the lowest officer under whom he is serving, and must exact the same from everyone in his command. Only thus can we obtain perfect cooperation, not only between units but throughout the whole nation, and it is only by perfect cooperation and absolute efficiency and perfection in the smallest details that we can hope to beat our perfectly organized enemy. The soldier that can spring to attention and salute perfectly on all occasions is certain to be smart and efficient in his more important duties.

Learn to "Click"

Drill is the mechanism of the battlefield, where the failure to do the right thing at the right instant may mean defeat. All drill is useless which does not insist on perfection in the smallest detail. Every moment of out of step is a moment lost in the winning of the war. The soldier who learns to perform every movement with a "click" is the one who will be a fraction of a second quicker than the enemy when he meets him with the bayonet, and he will thank his country for the training it has given him as he tugs the bayonet from the enemy in his first fight.

Certificates of Discharge

The British Government has done wisely in issuing a special certificate of honor, to be called "The King's Certificate on Discharge," to soldiers discharged through wounds or disabilities incurred on active service, or directly attributable to the action of the enemy; for instance, to air or naval raids. This certificate has been drawn up by command of the king, who considered that a fitting memento of the soldier's services, to be treasured as a family record, should be given to him. Similar certificates will be issued members of the air forces and the navy.

The army certificate shows soldiers saluting an enthroned Britannia framed in an elaborate border surmounted by

the arms of Great Britain. The inscription states that . . . "Served with honor and was disabled in the Great War. Honorably discharged on . . . George R. I."

Something of the kind might with advantage be employed in the forces of the United States. Certainly the present certificate of discharge would not be particularly impressive framed as a record of gallant service.

A reproduction of the British certificate can be found in the *London Times*, weekly edition, May 17, 1918.

Φ

Books for all Men in U. S. Service Are Provided by the Library War Service of the American Library Association

At the request of the War Department Commission on Training Camp Activities, the American Library Association has undertaken to supply reading matter to the men of our army and navy, wherever they may be.

This service extends to 39 large camps, to small camps and stations, to vessels, hospitals, transports, and overseas. It is the aim of the service to send books to every point where U. S. soldiers, sailors, and marines are stationed.

During the last seven months the Library War Service Headquarters at Washington reports 1,271,800 books shipped to 39 large camps, where there are trained librarians and 36 library buildings; 185,000 books to 211 small military camps, posts and stations; 130,000 books to 111 naval stations; 30,000 books to 111 vessels; 20,000 books distributed among 81 army and navy hospitals; 200,000 books shipped from dispatch offices for use on transports and overseas.

This distribution makes a total of approximately two million gift books in service through nearly 600 different agencies. In addition to these, 350,000 new books (largely technical) have been purchased and are in use.

Books and magazines of all kinds are available: good stories; technical books on military tactics, electricity, machine-shop work, trench fighting, aeronautics, automobiles, gas and such subjects; poetry; biography; books about the war; in fact, all books that men like to read.

Books will be found in A. L. A. camp libraries, in Y. M. C. A. and K. of C. huts, in charge of Red Cross secretaries and chaplains, in hospitals, barracks, mess halls, on ships—wherever U. S. army and navy men are in service.

If there are no A. L. A. books in any place where men are stationed, all that is necessary to obtain them is to send the following data to the Library War Service Headquarters, Library of Congress, Washington, D. C.

Name and address of camp (or vessel).
Kind of camp (or vessel).
Approximate number of men in camp (or on board).
What agencies are supplying reading matter and to what extent.
What local library, if any, is cooperating.
How many and what kind of books are needed.
How many magazines are needed.
Where will reading matter be housed.
Who should be notified when books and magazines are shipped.
Will he arrange for the circulation of this reading matter throughout the entire camp (or vessel)?

There is no red tape about getting the books; men in charge will be asked to keep simple records, instructions for which are furnished with each library.

Editorial Department

Intensive Training

The article on this subject is a reprint from "The Manual of Intensive Training" published in January, 1916, by Major Hunt, then first lieutenant of infantry. It presents a study of the possible application of the principles of the "Scientific Management" of the manufacturing industries to individual soldier training.

It suggests a reasonable standarization, conforming to War Department Regulations, of the infantry soldier of the year 1916 and of the infantry squad. It also describes a method of attaining this suggested standard with least waste of time and duplication of effort, together with means of recording and measuring the progress of development.

The efficiency of the system has been repeatedly tested during a period of several years in the instruction of regular troops and also of the Organized Militia.

The arrangement of the text is such that it may be used as a manual or as a program of intensive instruction.

The principles may readily be extended to the standardizing and testing of the company and of the higher units.

The necessity that infantry be developed to a uniform standard of fighting efficiency instead of the securing of efficiency in patches has led to practical use of standardization and test methods in several training centers, and has caused our officers to give considerable study to the subject of scientific management in training. This study is reprinted to aid in such investigations.

We must remember that the methods we are employing in training the army will have far-reaching results. They will have an effect on the life of the United States. For example, a man who has gotten himself into the habit of cleanliness in camp, into attention to details, is going to keep these habits up when he leaves the service. He is going to form the most important habit of making comparisons, and to make comparisons one must have standards. We are rather apt not to have them, but to be content with keeping the daily routine what it always has been. Life in the army will get a great many men out of that.

There is an impressive story told about the Illinois Agricultural Experiment Station. A man who had been farming soil of the kind used there one day came to see a demonstration. He brought with him his wife and children. He looked first at some corn on a plot of treated ground and then at the crop on the untreated land. Then it dawned upon his intelligence that the barren land had not been dressed with potassium. The realization of the one fact caused him to look at his wife and children, and he suddenly broke down and cried like a child. Later on he explained his emotion to the superintendent of the station. He had bought a small piece of land years previously, and the first crops were fairly good and he hoped for better ones to follow. But they became worse and worse. "My wife and myself and my older children have wasted twenty years on this land. Poverty, poverty always! How was I to know that this single substance

which you call potassium was all we needed to make this land productive and valuable?"

This man had learned a lesson from a standard. It was hard that he had to wait twenty years for the demonstration, but if he had trained himself to notice things, to see what methods were better than his own and to then find out how they would be applicable to his own problems, it would not have been necessary for him to have waited twenty years, and for a demonstrator. He could have formed his own standards. Military training properly carried out will enable men to do this with far-reaching consequences to their future lives. After all we are, all of us, workers in life, laborers in some way or another, and there are so many different things to be done in the army which must be well and accurately done that probably the largest lesson that military service teaches is that no work is unworthy except work that is badly done.

Φ

Cavalry and the Aeroplane

The editor has been asked to reprint this article which was written in February, 1909, and printed in the INFANTRY JOURNAL of July of that year. Reading it over, it is a rather interesting forecast of the present development of aircraft which is not going to stop with this war. In the British service the military and naval air services have been amalgamated into the Royal Air Forces, and it is fair to assume that with the end of this war we shall find that the war powers of all nations are thus divided. This development could not have come without war. There is too much inertia, there are too many vested interests, too many traditions in all armies to permit such radical changes under peace conditions. Such a conflagration as is now taking place does not merely permit, it enforces new construction.

This growth of air power does not make for military strength alone. It makes for peace strength. Aircraft are rapidly becoming a most formidable war weapon on land and sea, and they can be made only in the countries which have a high capacity for designing, constructing, and handling machines. These countries are few, and they are the countries which, from our point of view at least, are the most civilized countries. They are the countries where the people are most mechanically minded, and in such countries aircraft can manifestly be used most efficiently. Countries which cannot make them, which cannot efficiently use those they have bought abroad, are manifestly under a most serious military disadvantage when compared with countries which can do so. Indeed, will not such countries which cannot make and use aircraft automatically fall into a sort of dependence upon those which can, and will not this make for peace?

It is rather like the question of pistols and morphine. It was not so long ago when anyone in this country could buy either almost anywhere. Now the sale of both is rigidly controlled and that control certainly makes for peace. After all, why should not the means of killing on a very large scale be controlled as much as the means of killing on a small scale; will it not make for peace? Of course it would be a limitation upon the sovereignty of certain states, but are not the prohibitions concerning the purchase of pistols and of morphine limitations on the liberty of

individuals? It must always be remembered that at least one of the contributory causes of this present war, perhaps the main cause of it, was the redistribution of power in the Balkans caused by the Balkan War of 1912-1913, and that war was fought with purchased arms, arms obtained in France and Germany. Not one of the countries engaged could produce their own. The abolition of war is the control of the means of making war. Aircraft have become one of the most formidable means.

There are far-reaching questions, and the fact that it is possible to ask them shows how far we have traveled since 1909.

This article is printed as written. As originally printed there were certain omissions which were considered expedient to avoid offending the susceptibilities of our comrades in the cavalry. Perhaps they will be less susceptible now. Of course the article deals only with cavalry reconnaissance. Cavalry has still its uses in war.

A Great General Staff

The United States of America has embarked on the most stupendous undertaking of its existence. The efforts of the entire country, as well as those of our allies, are now being devoted to the one task of overcoming the Germans.

The fighting strength of this country now comprises the land forces and the naval forces. More than ever before in their history are these two forces working in unison. The transportation of our land forces across the ocean in the face of an active enemy calls for close cooperation of these two forces. As far as is known, satisfactory teamwork is being performed, but it would seem that the greatest possible teamwork should be maintained.

Recently a separation has taken place between the Signal Corps proper and the Air Division or Air Service. The Air Service has come into being and is fast assuming proportions far beyond that of a branch, or arm, of the land service. The personnel of this Air Service, owing to the nature of its work, is of a different sort from the personnel of which it is now a part. Because of the nature of its duties the personnel is much younger, and at present, at least, promotion is much more rapid. The element in which this service operates —the air—naturally places now, or will place in the not distant future, the Air Service in a category analogous to the land forces and the naval forces. It seems but reasonable, therefore, to assume that before long the Air Service will have outgrown its present bounds and will demand administrative facilities to compare with the present War Department or the Navy Department. Possibly the Air Department will be a necessity presently.

It is true that the greatest cooperation is required between air forces and land forces, but no more complete cooperation than is required between sea forces and land forces nor between the sea forces and air forces. The obvious requirement, based on necessity for close cooperation between the fighting forces of the country (land, sea and air) is a governing body which is able to coordinate the efforts of supply, administration and control. In other words, it appears that the time is fast approaching when for proper control and unification of effort of these three forces of the United States, a great General Staff composed of individuals

from all three forces and acting directly under the President or his representative—War Minister or whatever his title may be—will be a necessity, and plans should be perfected with as little delay as practicable with a view to enactment of whatever legislation may be necessary for its inauguration.

¶

The Publication of Reports

The British Government has published from time to time reports by commanders of military and naval operations during the present war, and it is probable enough that, during its continuance, pressure will be brought upon our Government to publish those of our commanders. There are good reasons for publishing them; there are better for not publishing them until the war is over.

The people of this country naturally want to know and know authoritatively what is taking place. It is their war. Their money is being spent in it; their sons and brothers are conducting it. Of course they will want to know what the commanding general did, how and why he did it, and know from his own pen. But there is a very alert enemy watching us who is trained, and well trained, in the art of deductions from all sorts of material. In war it is not a question merely of reading the ground and the troops in front of you. You have also to read the mind of the general in front of you. If you read it aright you can estimate how he will use those men and that ground.

No data can be more valuable for that study than his own explanation of how he conducted a certain operation and why. Whether he succeeded or failed is not the question. Such publications permit looking over a man's shoulder at his cards while he is playing the game. It is not going to help that player to win if he permits his antagonist to do it.

This drawback does not apply to a descriptive article based upon official reports and prepared by a competent military writer. Everything which the people of this country would want to read about a certain battle would be there. Illustrations and maps could be furnished to supplement the description. The personality of the commander or commanders would not appear if such a method were employed, and it ought to be employed. The people of the United States will want to know, and know fully, what is happening. The official communiques which are now being published do not supply this information.

Of course as yet we have fought no great battle under our own generals. We have been engaged, and we have done well in small things. The time is coming when heavier tasks will be given us, and when they are it will be well to be ready to tell the people of the United States what has taken place and tell it accurately, promptly, and in an interesting fashion. They are going to ask.

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Soldiers on the Land

It is obvious that if Great Britain and Canada find it worth while to consider the problem of the returning soldier, we should also do so. Before they do return there will be many discussions upon the subject. One proposal is given in the July number of the INFANTRY JOURNAL. Canada is making plans to offer land to returned soldiers. The Secretary of the Interior has represented in a letter, reprinted in this number of the INFANTRY JOURNAL, the immediate duty of preparing for the

return of American soldiers from service overseas by making agricultural lands ready for their occupancy. To this end he urged the wisdom of immediately supplying the Interior Department with a sufficient fund to make necessary surveys and studies for the reclamation of arid lands and swamp lands in various parts of the country.

Some of these surveys have been made. If the land has first to be surveyed and then reclaimed, it is possible that it will be too late, for one would think that an important part of such a scheme would be to have the land ready for distribution and occupation before the armies are demobilized. If this is not done the men will settle into other occupations and employments, and to then offer them land will make a further disturbance of industry. An important part of any such plan is to have something which can go into effect immediately upon demobilization.

Apparently there is some land available which has already been surveyed. According to the *Manufacturer's Record* of May 23, 1918:

> In the lower Rio Grande valley, extending from a point about 75 miles of where the international boundary stream empties into the Gulf of Mexico, up that river for nearly 100 miles there have been brought into cultivation during the past fifteen years about 150,000 acres of land. Althought practically all of this area is embraced in irrigation systems, water was applied to only about 60,000 acres in the two counties of Hidalgo and Cameron during the past season. It is stated that this irrigated acreage produced and there has already been sold during the year more than $6,000,000 worth of products.
>
> The cost of constructing the necessary irrigating systems is often more than met by the value of one year's crops grown upon the irrigated lands. As the public lands of Texas are owned by the state, difficulties, and perhaps serious difficulties, would interfere with the construction by the U. S. Government of systems there.
>
> Yet it is conservatively estimated that there are more than 10,000,000 acres of land in South Texas alone which are easily capable of being reclaimed from their pristine state and made to produce abundant crops of various kinds. Not only can vast areas of the land be watered from storage reservoirs, but there is a wide belt of country in which flowing artesian wells can easily be obtained. It is pointed out that the available irrigation lands of the Rio Grande Valey on the Texas side of that stream have barely been touched.
>
> There is, however, a limit to the amount of water which can be diverted from the river.

At the close of the Revolutionary War officers and soldiers were paid with land script which at once caused a large emigration to the west of the Alleghanies. Still the people of this country were much more agricultural then than they are now, and it is perhaps doubtful whether the possession of land which they will have to develop themselves will make as great an appeal to as relatively large a proportion of the soldiers. Immigration will be less after the war, or at least it looks as though the belligerents would try to keep their discharged soldiers at home where they will be needed. This will, of course, limit farm workers in this country. Whatever happens it does not seem probable that military colonies on the land will be possible. They hardly suit the genius of our people and, once in civilian clothes, there will be no desire to keep up military distinctions.

Transporting Prisoners

Among the duties which have fallen to the U. S. Army is one which no one would have dreamed of in 1906—that of guarding German prisoners of war. Perhaps not all the procedures laid down in this article as expedient, and which enabled the writer to carry out successfully an unpleasant duty, would be necessary in guarding prisoners of war, but certainly some of them would be. Accordingly this article has suggestions for handling both classes of prisoners, military and prisoners of war. It is a new duty which must be met, and it is well for the officer to whom it is intrusted to have some preliminary ideas on the subject formed before he is called upon to perform it.

Book Reviews

Glossary of Aviation Terms—English-French and French-English, by Lieut. V. W. Pagé and Lieut. Paul Montariol. New York: Norman W. Henley Publishing Company, 1917. Cloth, demy 8vo, 97 pages, illustrated. Price, $1.00.

This book was prepared by two officers of the air service, one American and the other French, both assigned to the instruction department of the Aviation School at Mineola, Long Island, and is accordingly based upon actual experience. The lists of terms in general use are given in French with English equivalents and in English with corresponding French words. A valuable feature of it is the charts giving the names in French and English beside the outlines of the parts themselves.

Musketry, American edition, edited by Capt. E. J. Solano, and Hand Grenades, by Capt. S. A. Dion. New York: George U. Harvey Publishing Company, 1917. 258 pages, illustrated. Cloth, cap. 8vo. Price, $1.00.

This is a very well-prepared treatise, fully illustrated. There is a chapter devoted to grenades, covering the principal types of hand and rifle grenades. The work, however, adds little, if anything, to our official manuals, although it would be, doubtless, a useful volume to those who are not provided with the latter.

The Care of Troops (for line officers), by Maj. Frederick S. Macy, M. C., U. S. A. New York: Harvey Publishing Company. Cloth, cap. 8vo., 176 pages. Price, $1.00.

A very well-written and timely treatise, especially designed for young and inexperienced company officers. All our new officers will find it most valuable, as it contains, in a very simple form, the gist of common army experience, in preserving the health and well-being of a command.

Rapid Training of Recruits, by M. V. Campbell. New York: Frederick A. Stokes Company, 1917. Limp cloth, 16mo, 180 pages. Price, $1.00.

This is an adaptation to our service of a British scheme for quick training. As its field is completely covered by our own training programs, its principal use, if any, would seem to be to furnish alternative studies, if our own numerous publications leave any time for such.

Simplest Spoken French, by W. F. Giese and Barry Cerf. New York: Henry Holt and Company, 1918. Cloth, cap. 8vo, 110 pages. Price, 65 cents.

A pocket-size treatise containing the essentials for simple conversations, including grammar and pronunciation. There is a general work list at the end, and the commoner phrases, sentences and expressions, in English and French. It has waterproof binding. A useful little book for those who have no knowledge of French.

Field Training—Signalling. American edition, edited by Capt. E. J. Solano. New York: George U. Harvey Publishing Company, 1918. Cloth, cap. 16mo, 217 pages, illustrated. Price, $1.00.

An excellent little book for those anticipating a course of training in training camps with a view to a commission.

It is covered by our War Department pamphlets and has nothing new to offer to the trained officer, but would initiate the novice into the secrets of patrolling reconnaissance, attack and defense, use of ground signalling, map reading, etc.

French in a Nutshell, by Jean Leeman. New York: E. P. Dutton and Company, 1918. Cloth, 88 pages. Price, $1.00 net.

A well-arranged and brief French course in twelve lessons, and a one-act comedy. Just sufficient grammar to enable the student to engage in short conversations. A fairly extensive conversational vocabulary worked up into typical French sentences followed by the English equivalents. A number of the commoner idioms are found.

The wrapper states that the work is indorsed by the Alliance Francaise. Apparently a very useful little volume.

The Marvel Book of American Ships, by Capt. Orton P. Jackson and Maj. Frank E. Evans. New York: Frederick A. Stokes and Company, 1917. Cloth, royal 8vo, 391 pages and numerous illustrations, many in colors. Price, $2.50.

This book is a review of the ships of the past and the present of the U. S. Navy, how they are built, what they look like, and how they are handled. The authors describe how a sailor is trained, how he lives, and what he does on board ship. There are chapters on the Naval Academy, on ceremonies and uniforms, and on some of the sea battles of the United States. Of course the chapters on the present war are yet to be written and the photographs of some of our present material are yet to be printed, but the book gives a good general view of our Navy as it was when our first destroyer flotilla sailed for England in May, 1917. It is not probable that the routine of life on our ships has changed much since then. Our ships remain the same, and the sailor has the great advantage over the soldier that his drill ground is his battlefield.

If it were possible to do it, a book like this would be a good one to write for the Army, but just now the people who could are all rather too busy in training and fighting to produce one. Perhaps somewhere someone is making the notes for something similar to be put together after the war. If one may judge from the enormous number of regimental and battalion histories, accounts of life in the armies and similar works which were issued after the Civil War, there will be a demand for such books after this war is over, after the regulations concerning secrecy are removed and after our armies are demobilized.

Manual for the Use of Troops in Aid of the Civil Authority, by Brig. Gen. Louis L. Babcock. New York: George H. Doran Company, 1918. 101 pages. Cloth, cap. 8vo. Price, $1.00.

New York State today confronts not only the same local problem as every other State, viz., that of safeguarding the lives and property of its citizens during the absence of the National Guard, its volunteers in the Federal Army and Navy, and its conscript soldiers, but it also has the added responsibility of guarding its railways and waterways, over which the entire United States is sending to the great port of New York large quantities of supplies for shipment abroad to our soldiers and

to our allies. General Babcock has set out clearly the law of New York upon this important subject. The contents of the book will show how the subject has been covered. They are as follows: General Considerations, Provisions of the Penal Law and Code of Criminal Procedure, The Law of the State Relating to the Employment of the Guard in This Duty, Preparation for the Duty, Tactical Considerations and Pay and Pensions of the State of New York.

Offensive Fighting, by Maj. Donald M. McRae, M. C., Infantry Reserve Corps, U. S., formerly Major, Canadian Infantry. Philadelphia: J. B. Lippincott Company, 1918. 196 pages and plates. Price, $2.00.

This book is based on the experiences of the author with the Canadian forces in France during the first three years of the war, during which he was almost constantly in command of raiding parties in No Man's Land between the British and German lines. He accordingly speaks not only effectively but with authority, and his book is worth careful consideration. Proper attention to his lessons should aid in securing success and in obtaining it with fewer casualties than would otherwise occur. It does not seem easy to take another man's advice. There is a constant tendency to want to find it all out yourself. This is a dangerous tendency when yielded to in war, for it may easily mean loss of men and failure of plans. It is a great deal better to consider what is said on the subject by a man who knows because he has been there and done it. Major McRae has.

The book has been authorized for publication by the Secretary of War upon recommendation of the General Staff, U. S. Army. The chapters are arranged in convenient lecture form. The author says, "Get the information to the men. They will have to use it with you."

The following subjects are covered: Mine Crater Consolidation, Trench Raids, Patrols and the Control of No Man's Land, Front Line Observations, Cooperation Between Infantry and Artillery, Infantry in Attack, Trench Routine, and Notes on the Use of Prismatic Compass.

Military Aeroplanes, by Grover C. Loening. Published by author, 45 11th Street, Long Island City, New York, 1918. 202 pages, with numerous illustrations. Price, $4.75.

"The Journal of the Society of Automotive Engineers," which can speak with authority on the subject, says that so many present-day works on aviation deal with the subject from a popular or a romantic viewpoint that it is a pleasure to announce this book which, although it may be said to be written for the student aviator, is also of the greatest value as an introduction to aeronautic engineering practice. The author is professionally well qualified to deal with the subject in view of his long experience in the design and manufacture of air craft. The book proposes to furnish the student aviator with a knowledge of fundamental features in order to aid him in acquiring the necessary instinct of what the machine is and what it is doing at all times.

The French "75," by Lieut. Frank H. Canaday. Wisconsin: George Banta Publishing Company, 1918. Paper, cap. 8vo, 32 pages, with sketches of parts of gun. Price, 30 cents.

This pamphlet is a translation of

"Le 75," which appeared in the French series "Pages L'histoire" as a conference given by M. Th. Schlossing, Jr., a member of the Institute. It is accordingly a good description of the gun which is playing so important a part on the French front.

The translation is rather literal and some of the terms employed by the translator are not exactly those which would be used in an American manual for artillery, but the description is clear enough and shows what the gun is and how it works.

THE UNITED STATES INFANTRY ASSOCIATION

"The object of the Association shall be to promote the efficiency of the Infantry arm of the military service of our country by maintaining its best standards and traditions, by fostering esprit de corps, by the dissemination of professional knowledge, and by exchange of ideas as to the utilization of such knowledge with particular reference to the rôle of Infantry in modern war."—Article III of the Constitution.

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Dues are $1.00 annually, payable in advance. Members may obtain the JOURNAL for $2.00 per year.

All communications should be addressed to the Secretary, the United States Infantry Association, Room 508, Union Trust Building, Washington, D. C. Cable address: Infantry, Washington.

An Appeal

A serious situation faces the Infantry Association. Hundreds of our subscribers have gone overseas, and we are daily receiving notices from the postmasters at their former stations that copies of the INFANTRY JOURNAL addressed to them remain undelivered. This is doubly unfortunate, because the subscriber fails to receive all copies of the JOURNAL that he has paid for and the Association, having already incurred the expense of printing and mailing the magazine, is put to the further expense of paying return postage. There is but one remedy for this state of affairs. It rests entirely with the subscriber. Each member of the Association and subscriber to the INFANTRY JOURNAL must notify us of his change of address. We cannot know, except in the most haphazard sort of way, that a subscriber has changed his address. We know that in the hustle and bustle of departure it is not always easy to remember to notify us to change the mailing address, but somewhere between here and the new station an officer should find time to notify us of his departure, so that we may do our part in correctly forwarding the magazine.

The INFANTRY JOURNAL is being regularly delivered to those who have notified us of their new address and who have paid their subscriptions, so that if a subscriber with the A. E. F. is not receiving his copy of the magazine the fault is largely his; he has not informed us of his departure or has not renewed his subscription promptly, both of which are important. Those of us who are left behind are trying faithfully to keep the INFANTRY JOURNAL going; first because the magazine has a useful function to perform, and second, because we feel that each officer, when he returns to America with the heroic thousands who will have valiantly done their duty in restoring the rights of mankind, will want to be greeted by a live and prosperous Association prepared to advocate and protect the rights of the returned soldiers. You are heroes now, but glance at history and see in what esteem armies are held after the victorious troops have completed their work and general peace is declared.

The Infantry Association and the INFANTRY JOURNAL will be able to do their work effectively when peace once more reigns only if both are maintained in full vigor. They can only be so maintained if the members and subscribers do their part now. And how little is the obligation and simple the duty. Each of you has only to keep us posted as to your mailing address and remit the annual dues of $3.00. We hope we will not have to repeat this plea nor to plead in vain. We will not if each officer will take this appeal as a personal solicitation.

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No. 44

WASHINGTON, D. C.,
AUGUST 1, 1918.

1. The pages that follow are fast becoming an honor roll of business firms that recognize the work that the INFANTRY JOURNAL is doing.

2. Each month shows a substantial increase in the number of business concerns that are already executing Government Contracts, or that hope to do so by becoming known to the contracting officers of the Army through the medium of their announcements here.

3. This work is also cooperative in a way. Cooperation has long been the slogan of the INFANTRY, and these firms are cooperating by advertising here and making it financially possible to publish a better and more human periodical.

4. Surely our members and subscribers can do no less than to return the courtesy of our advertisers by making all their purchases from among our advertisers. And by this we do not mean personal purchases only.

5. Other things being equal throw the weight of your influence as purchasing officers in favor of the firms advertising here. You will be helping the Government because our advertisers are representative of the best in their respective lines and the best should be none too good for the Government.

6. Finally, remember that the spirit of cooperation is typical of the Infantry. It is the Infantry Way! It is the Only Way!